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GEOGRAPHICAL HANDBOOK SERIES

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CHINA PROPER

VOLUME III

ECONOMIC GEOGRAPHY, PORTS AND COMMUNICATIONS

July 1945

NAVAL INTELLIGENCE DIVISION

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PREFACE

In 1915 a Geographical Section was formed in the Naval Intelligence Division of the Admiralty to write Geographical Handbooks on various parts of the world. The purpose of these handbooks was to supply, by scientific research and skilled arrangement, material for the discussion of naval, military, and political problems, as distinct from the examination of the problems themselves. Many distinguished collaborators assisted in their production, and by the end of 1918 upwards of fifty volumes had been produced in Handbook and Manual form, as well as numerous short-term geographical reports. The demand for these books increased rapidly with each new issue, and they acquired a high reputation for accuracy and impartiality. They are now to be found in Service Establishments and Embassies throughout the world, and in the early years after the last war were much used by the League of Nations.

The old Handbooks have been extensively used in the present war, and experience has disclosed both their value and their limitations. On the one hand they have proved, beyond all question, how greatly the work of the fighting services and of Government Departments is facilitated if countries of strategic or political importance are covered by handbooks which deal, in a convenient and easily digested form, with their geography, ethnology, administration, and resources. On the other hand, it has become apparent that something more is needed to meet present-day requirements. The old series does not cover many of the countries closely affected by the present war (e.g. Germany, France, Poland, Spain, Portugal, to name only a few); its books are somewhat uneven in quality, and they are inadequately equipped with maps, diagrams, and photographic illustrations.

The present series of Handbooks, while owing its inspiration largely to the former series, is in no sense an attempt to revise or re-edit that series. It is an entirely new set of books, produced in the Naval Intelligence Division by trained geographers drawn largely from the Universities, and working at sub-centres established at Oxford and Cambridge. The books follow, in general, a uniform scheme, though minor modifications will be found in particular cases; and they are illustrated by numerous maps and photographs.

The purpose of the books is primarily naval. They are designed first to provide, for the use of Commanding Officers, information in a

comprehensive and convenient form about countries which they may be called upon to visit, not only in war but in peace-time ; secondly, to maintain the high standard of education in the Navy and, by supplying officers with material for lectures to naval personnel ashore and afloat, to ensure for all ranks that visits to a new country shall be both interesting and profitable.

Their contents are, however, by no means confined to matters of purely naval interest. For many purposes (e.g. history, administration, resources, communications, etc.) countries must necessarily be treated as a whole, and no attempt is made to limit their treatment exclusively to coastal zones. It is hoped therefore that the Army, the Royal Air Force and other Government Departments (many of whom have given great assistance in the production of the series) will find these Handbooks even more valuable than their predecessors proved to be both during and after the last war.

J. H. GODFREY
Director of Naval Intelligence
1942

The foregoing preface has appeared from the beginning of this series of Geographical Handbooks. It describes so effectively their origin and purpose that I have decided to retain it in its original form.

This volume has been prepared for the Naval Intelligence Division at the Cambridge sub-centre (General Editor, Dr H. C. Darby). It has been written mainly by Mr B. M. Husain and Mr P. O'Driscoll, with contributions from Mr W. R. Cockburn, Mr E. M. Gull and Mr H. A. P. Jensen. The maps and diagrams have been drawn mainly by Mr D. J. Bennett, Miss H. C. Collins, Miss K. S. A. Froggatt, Mrs Marion Plant and Miss J. D. I. Tyson. The volume has been edited by Professor P. M. Roxby and Mr P. O'Driscoll.

E. G. N. RUSHBROOKE
Director of Naval Intelligence

July 1945

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The rapidity with which events have moved in China in recent times and the quick succession of phases, each with its own conditioning factors and salient characteristics, makes a coherent and clear statement of the position in relation to agricultural, mineral, and industrial output and distribution peculiarly difficult. This applies with equal force to the treatment of communications. To avoid misconceptions it is important to bear in mind that the so-called ' modern ' period of economic development in China has the following distinct divisions:

1. *Prior to the establishment of the National Government at Nanking in* 1928. In this first phase the development of mining by modern as distinct from traditional methods, of new types of mass production industries and the construction of railways, were primarily initiated and financed by foreign interests. There was already a considerable amount of private Chinese enterprise, but the unsettled conditions prevailing after the Chinese Revolution of 1911–12, and especially during the civil wars of the early twenties, mainly restricted it to the treaty ports and their immediate hinterlands. It was local and spasmodic and did not form part of a national economic programme.

2. *From the establishment of the National Government at Nanking in* 1928 *to the outbreak of the Sino-Japanese war, July* 1937. During these eventful nine years China made great strides towards unity, a National Economic Council was formed, and the outlines of a national policy of economic development and planning were worked out. The State began to play an active part in the supervision of industry and more particularly in the development of a national system of communications. Most of the available statistics relate to this period, and those for 1936 give the position on the eve of the Sino-Japanese war.

It has, however, to be also remembered that mid-way in this period came the Japanese occupation of Manchuria and the establishment of the puppet state of 'Manchukuo' (1932), which was not recognized by any Great Power except Japan herself, until it was recognized by Italy in 1937 and by Germany in 1938. This involved the loss to China of nearly one-third of her territory and that part of it which, in respect of industry and especially of railways, was the most developed (with the exception of the Yangtze delta). Comparative statistics of railways mileage, iron-ore production, etc., are of course greatly affected by this fact.

3. *The War Period* (*since July* 1937). The tremendous effects of the war upon the economic life and outlook of China have been already discussed (see vol. ii, p. 144). The orientation of the country has been revolutionized, and the National Government has assumed almost complete control of industry and transport. At the same time the social structure is undergoing rapid change, and this of itself must have far-reaching consequences upon future economic trends. Some at any rate of the many new factors affecting the location and relative importance of industries are likely to be permanent, and the determination of China to recover control of Manchuria, after the successful termination of the war, has also to be remembered in any forecast of the future economic position.

The plan adopted in the following chapters dealing with the economic geography, problems, and potentialities of contemporary China is: (*a*) to sketch (briefly) the development and controlling factors prior to 1928; (*b*) to discuss in some detail the evolution under the regime of the National Government (1928–37), and to give a statistical account of the position on the eve of the Sino-Japanese war; and (*c*) to describe, under each important aspect, the principal changes and new developments of the war period.

General Conditions

China is a great agricultural civilization; all her social and economic problems must be viewed in this light. Approximately three-quarters of the population are said to be directly engaged in agricultural pursuits, and the proportion of those dependent on the land for their livelihood to be greater still. The treasure of China is her soil, and the reconstruction of rural life is the problem of her future. The interests of millions of farming families, their happiness and well-being, are at stake.

The Physical Basis

An appraisal of the characteristics and development of Chinese agriculture must take into account the physical basis which affects the type and success of land utilization. The various aspects have already been considered in detail (see vol. i, Chapters i–viii), and it is sufficient to say that the natural foundation is at least as favourable as in other countries of comparable dimensions. The climate ranges from the extreme conditions of North China, through the zones of temperate winters and moist, hot summers, to the constant humid heat of South China, where a combination of multiple-cropping and intertillage is possible. The soil also shows differences considerable enough to allow a variety of crops and rural economies.

The Agricultural System

In spite of the relatively good physical basis, wide tracts of China are unfit for cultivation. The proportion actually utilized has been estimated at 27 per cent. (232 million acres or 340,000 square miles.) [1] An outstanding feature is the intense concentration in the alluvial plains and river basins such as the North China Plain, the Weiho valley, the Yangtze delta, the Central Yangtze Basin, and the Red Basin, to the exclusion of all but the lower slopes of the hilly regions. Chinese agriculture is greatly taxed by the number of people who have to be supported by such a relatively limited terrain, and an important problem is whether by widening the basis of production and the application of capital and modern technique much of the

[1] Most of the statistics in this section are based on the comprehensive survey of Chinese agriculture carried out by Professor J. L. Buck of the Agricultural Department of the University of Nanking. The results of the survey have been published in *Land Utilization in China* (Nanking, 1937) accompanied by *Atlas* and *Statistics* volumes.

hill country of South and Central China and extensive areas in the north-west can be brought into profitable use (Fig. 1).

Within this rural framework there has developed a farming

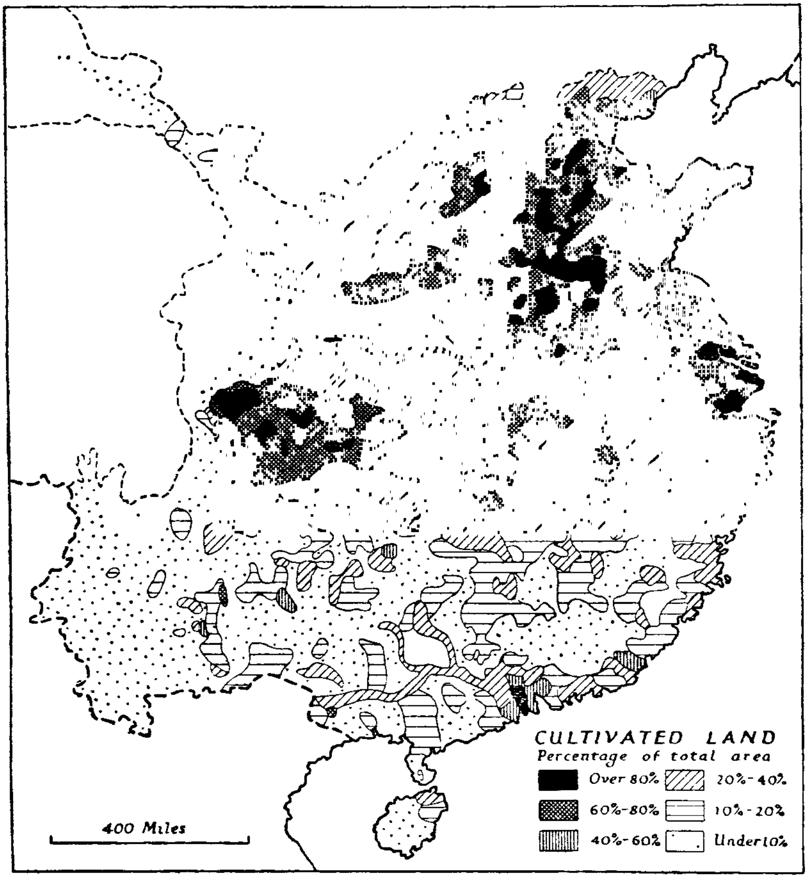

Fig. 1. Percentage of the total land cultivated

Based on Buck, J. L., *Land Utilization in China : Atlas*, p. 34 (Nanking, 1937). The great bulk of the cultivated land in China is in the alluvial plains and valleys. The hillsides are partly cultivated in the wheat region and in the Szechwan rice area, but in the rest of the rice region there is limited hill cultivation only (Fig. 2). The map understates the amount of cultivation in the less accessible areas, where low percentages indicate areas of uncultivable land rather than good arable land awaiting cultivation.

system similar to market-gardening. The agricultural landscape has almost everywhere a small-scale pattern, and the fields are divided into gardens rather than farms. The system is intensive, and aims

at feeding the greatest number of mouths on the spot. Population pressure, combined with the division of land which has taken place through many generations, has resulted in small farms and low productivity. Yet the Chinese farmers have, by applying the experience of centuries, acquired a remarkable ingenuity in wresting a livelihood from the soil. Their constant attention, their unremitting toil, and their infinite patience provide them in normal times with the means of subsistence. Certain human qualities, such as their optimism and fortitude and their honesty and community spirit, have also helped them to face recurrent calamities. This frugal, cheerful, industrious peasantry, so well described by Keyserling, forms one of China's greatest assets :

> There is no other peasantry in the world which gives such an impression of absolute genuineness and of belonging so much to the soil. Here the whole of life and the whole of death takes place on the inherited ground. Man belongs to the soil, not the soil to man : it will never let its children go. However much they may increase in numbers, they remain upon it, wringing from nature her scanty gifts by ever more assiduous labour ; and when they are dead, they return in child-like confidence to what is to them the real womb of their mother.[1]

The elaborate technique applied by the farmer varies in detail from region to region, but everywhere is designed to combine maximum production with conservation of fertility. There is a universal economy of materials, implements, and space, and only time and labour are used on a prodigal scale. Where the natural conditions are favourable the land is prepared by grading it to water-level. This checks erosion, retains the water on the fields, and replenishes them with fertile, alluvial soil, which is washed down by the flood waters. The lower hills are often terraced up to the summits, and the fields are graded and bounded by raised rims which retain the run-off until the suspended sediments have settled (Plate 1). The fertility of the land has been conserved with a remarkable efficiency, and for centuries canals, rivers, and the sea have been made to contribute to it. Few chemical fertilizers are used, but the wastes of the human body, of animals, of vegetables, and of fabrics are, after meticulous preparation, returned to the soil as manure. Thus has the soil of China after some four thousand years of intensive cultivation retained its fertility. Given favourable conditions, the abundant labour supply makes multiple-cropping possible, and in the south as many as three or even four crops may be grown simultaneously. Rice is often planted in seed beds and later patiently transplanted

[1] Keyserling, A. G. H., *Travel Diary of a Philosopher*, vol. ii., p. 71 (London, 1925).

by hand, thereby increasing the periods during which the fields are in use. (Plates 2, 3 and Figs. 3–5).

From time immemorial droughts and floods have devastated huge areas leaving a trail of famine, disease, and death in their wake. The peasant has always been threatened with an excess or a deficiency

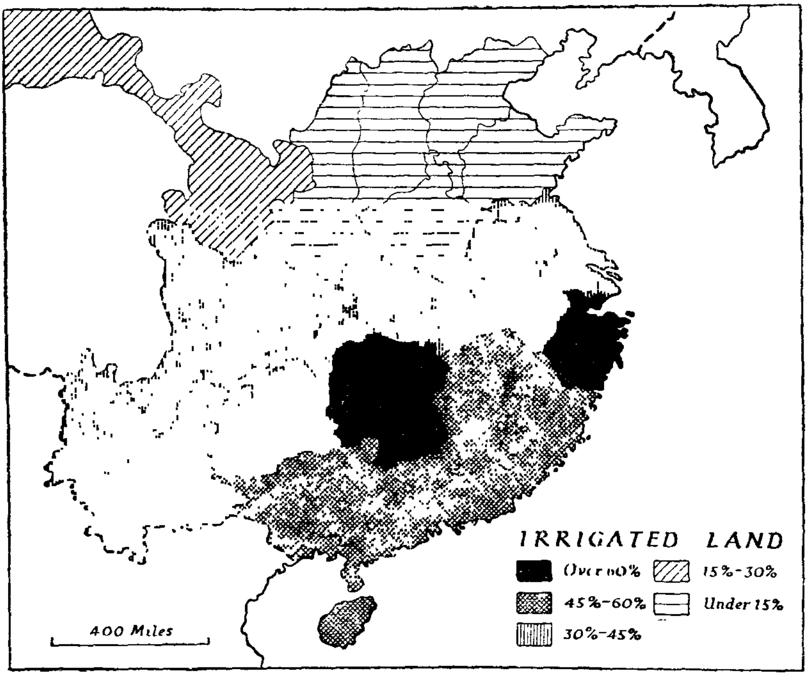

Fig. 2. Irrigated land

Based on Trewartha, G. T., 'Ratio Maps of China's Farms and Crops' (*Geographical Review*, vol. xxviii, p. 106 (New York, 1938).
The percentages indicate the proportion of irrigated land in the total cultivated area. In China most of the irrigated land is in the wet South rather than in the sub-humid North, as the primary use of irrigation lies in supplementing the relatively abundant rainfall for the growth of an amphibious crop such as 'wet' rice. Over the country as a whole the irrigated land comprises about 24 per cent. of the cultivated area, but in the greater part of North China the proportion is below 10 per cent. There is a remarkable increase in the use of irrigation 150–200 miles north of the Yangtze, where rice begins to be the major crop.

of water, and water-control has been essential for his continued existence. There consequently developed an elaborate system of canals and reservoirs, and an extensive network of dykes built along the main waterways. This required a large labour force, for dykes must be maintained, sluices kept in repair, crops irrigated by streams, and ricefields flooded to the right depth. This system of water-

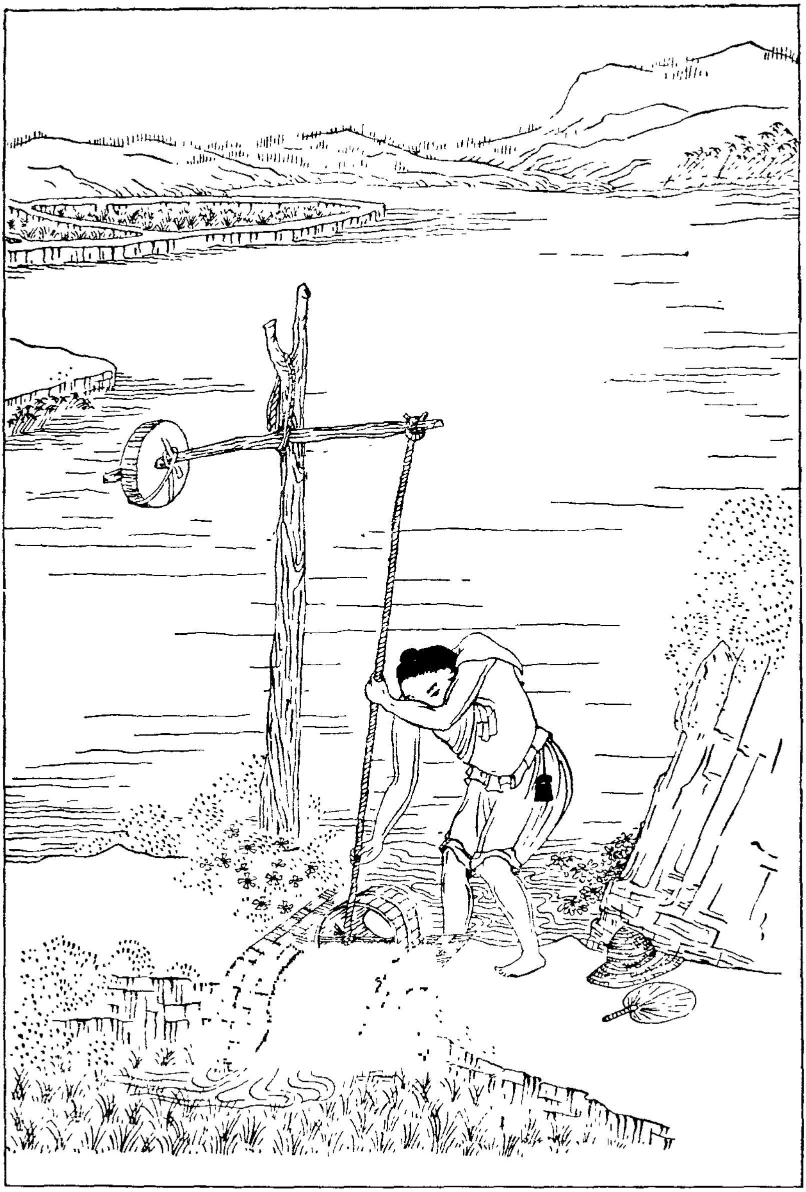

Fig. 3. Irrigation of the ricefields

Based on Sion, J., *Géographie Universelle*, tome ix (*Asie des Moussons*), première partie, p. 51 (Paris, 1928).

Figs. 3–5 are reproductions of woodcuts in *Keng Chih Tu Shih*, a book on rice and silk culture by Lou Shou of the Sung dynasty (twelfth century), and edited in 1796.

control, built up so painstakingly over long centuries, was an outstanding achievement, and alone has permitted the great growth of population. (Plates 4, 5, 6 and Figs 2, 3).

While the agricultural technique is elaborate and the use of the land intensive, the Chinese peasant suffers from many handicaps. His capital resources are slender, and his implements, judged by Western standards, are primitive. The success of the farming system depends primarily upon individual skill and a large labour

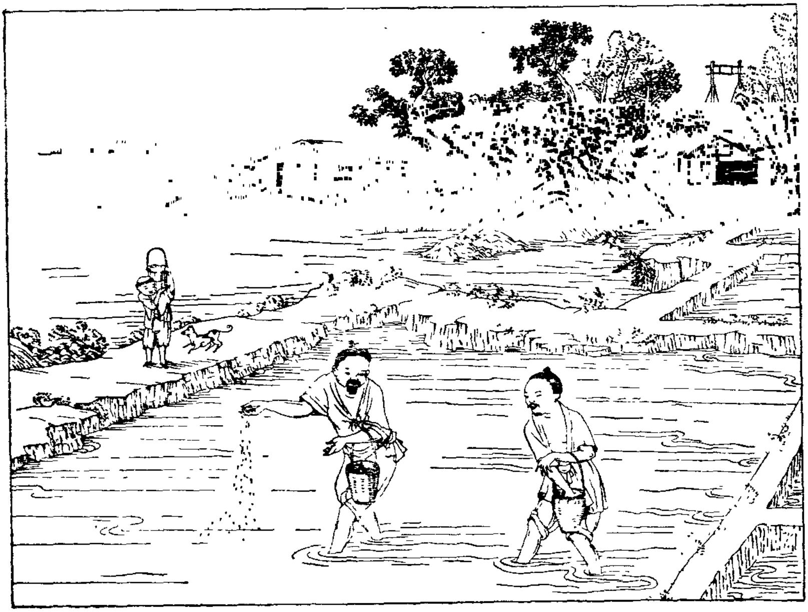

Fig. 4. The sowing of rice in seed-beds

Based on Cressey, G. B., *China's Geographic Foundations*, front end-paper (New York, 1934).

supply. The soil is still mainly cultivated by the hoe, and the plough, where used, is generally drawn by man-power, water-buffalo, or ox (Plate 7). A technique which had endured and developed over such a long period of time must have certain advantages, but centuries of isolation have narrowed it. Illiteracy, poverty, and seclusion have hitherto prevented the Chinese farmer from availing himself of the facilities afforded by modern technique and applied science. The problem now facing rural China is to link these to the traditional skill and experience of the peasants without destroying their social fabric.

The Concentration on Cultivation

The concentration on cultivation is another aspect of the intensity of Chinese agriculture. It is estimated that 27 per cent. of all land is utilized for crops, 4·6 per cent. for pasture, and 8·7 per cent. for forest. Of the remainder (approximately 60 per cent.) much is certainly unsuitable. It is estimated that more than 10 per cent. could be cultivated if the problem of soil erosion were solved. As it is, approximately 90 per cent. of the farm area in China is in crops

Fig. 5. The stacking of grain

Based on Cressey, G. B., *China's Geographic Foundations*, back end-paper (New York, 1934).

as compared with 27 per cent. in England, and 12 per cent. in the United States. The corresponding figures for pasture are 1·1 per cent. and 43 per cent. (The total of 4.6 per cent. for pasture in China mentioned above is chiefly made up of rough grazing outside the farm area on the western and particularly the north-western margins of China Proper beyond the Great Wall.)

These statistics bring out the great contrast between Chinese and Western agriculture. Animal husbandry has no importance in China except in the north-west. The consumption of animal products is low, and there is little evidence of greater consumption in

the past. It is primarily a question of human food, and land is too precious to be spared for raising animals. It is more economical to grow directly consumable crops, and it is the concentration on vegetarian products, particularly rice, which has made possible the characteristic dense population per square mile of crop area. Animals such as oxen and water buffaloes are primarily for draught purposes. Poultry and pigs are the only notable exceptions. Eggs are an important item of export and pigs require little attention and subsist on what is entirely unfit for human consumption. The best prospects for the animal industry are in the hill country, though, unfortunately, considerable areas have been shorn of their grass cover, which is used as fuel. In the pastures of the north-west, however, there are distinct possibilities of the Mongol tribesmén and the Chinese settlers playing complementary parts in the development of a woollen industry based on sheep farming.

This remarkable concentration on cultivation has greatly modified the original landscape. Nearly one-half is irrigated. Water rights, indeed, are a constant source of dispute and need to be more clearly defined and upheld by legal processes. Terracing is common, and accounts for a quarter of the cultivated land. Other areas have been subjected to soil erosion, because forests have been cut down and grassland broken up. The only solution of this problem appears to be a policy of reafforestation, though this must be a very slow process (see vol. i., p. 202).

Agricultural Regions

In a country so vast as China, with such varying conditions of relief, soil, and climate, there are naturally different types of rural economy. The regional division here adopted is that suggested by Professor J. L. Buck, and is based on a comprehensive field survey of land utilization in China (see footnote, p. 3). It has been widely accepted, and its close correlation with the physical and climatic regions (see vol. i., pp. 47, 241) gives a much more intelligible view of Chinese agriculture than a survey by provinces or political divisions.

The fundamental agricultural distinction between the wheat region and the rice region corresponds to the major physical division into the north with its calcareous, rather porous soils and dry climate and the south with its impervious clay soils, its abundant rainfall and humid heat, and its longer growing season. The north is

essentially the region of 'dry' crops such as millet, kaoliang, and maize, with wheat universally grown and dominant. The farm animals include mules, donkeys, and oxen, and in some parts sheep and cattle are reared. Meat becomes an element in the diet. The

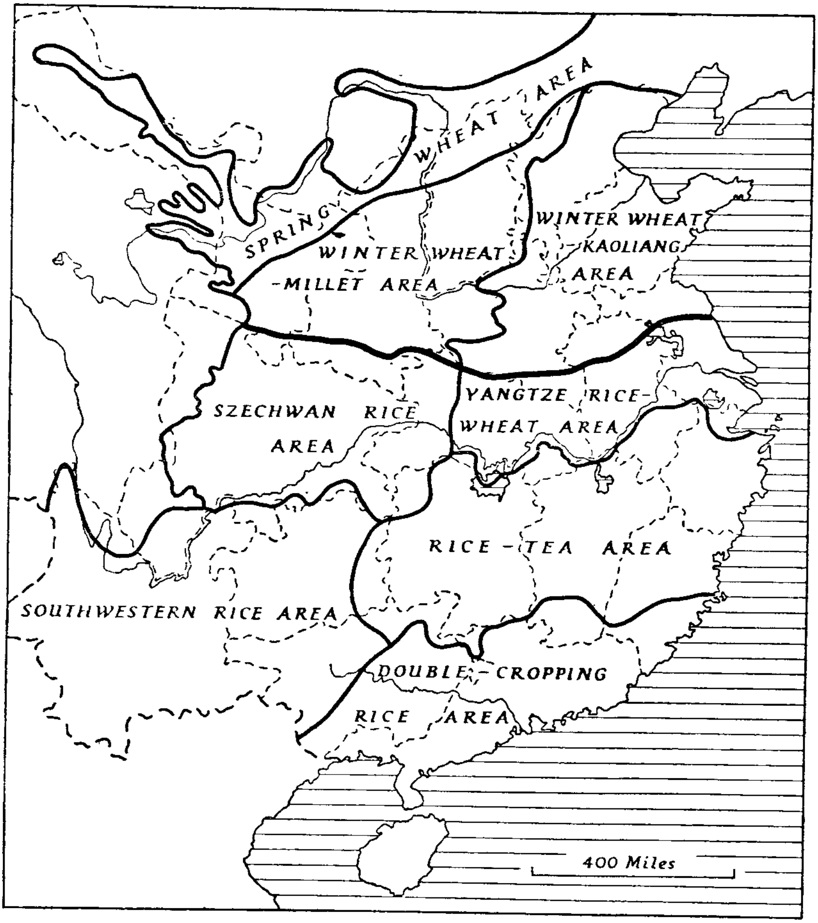

Fig. 6. Agricultural regions and areas

Based on Buck, J. L., *Land Utilization in China : Atlas*, pp. 9, 10 (Nanking, 1937). The heavy black line divides the wheat region of the North, where rice is grown in scattered patches only, from the rice region of the South.

green south, on the other hand, is a land of 'wet' crops, and of double-, sometimes treble-cropping with rice dominant in the lowlands and the water buffalo as the characteristic farm animal. Between these two major regions there naturally tends to be a

transitional zone, but there is a fairly definite line of division which trends from north of the Hungtze hu in Kiangsu province south-west to the Hwai ho in southern Honan, and thence along the northern border of its valley, and terminating in southern Kansu at the edge of the Tibetan massif, close to the headwaters of the Kialing kiang (Fig. 6).

It is estimated that a little over 50 per cent. of the cultivated land is in the wheat region, and a little less than 50 per cent. in the rice region. The wheat region, however, contains only one-third of the gross area compared with the rice region, which has two-thirds (Fig. 1). The great plain of North China is responsible for the high percentage of cultivation in the former. Owing to the better physical conditions, the mountainous lands of South China can be put to more productive use than those of the north.

The different types of rural economy make possible a division of the wheat and rice regions into eight areas (Fig. 6):

(A) *The Wheat Region*

1. The Spring Wheat Area
2. The Winter Wheat-Millet Area
3. The Winter Wheat-Kaoliang Area

(B) *The Rice Region*

4. The Yangtze Rice-Wheat Area
5. The Szechwan Rice Area
6. The Rice-Tea Area
7. The Double-cropping Rice Area
8. The South-western Rice Area

1. *The Spring Wheat Area*

This long band of country of varying width lying in the northern and north-westerly parts of China includes much of Jehol, southern Chahar, southern Suiyuan, northern Shansi, south-eastern Ninghsia, and north-western Kansu. The physical conditions are difficult, the rainfall is low and uncertain, and the growing season is limited to about five frost-free months. A high proportion of the land is not capable of cultivation, and the cultivation of the higher parts has probably gone beyond its most profitable use and would yield a higher return if it were devoted to grazing.

The characteristic crops are millets, potatoes, and spring wheat, and there is a less important production of oats, kaoliang, and the opium poppy. Winter crops are grown only in a few limited areas, and there is practically no double-cropping. This is one of the few

Plate 1. Terraced ricefields

Systematic terracing of the lower slopes is commonly employed to secure as wide an extension as possible of crop land.

Plate 2. Planting rice, Yunnan

The rice seedlings are here being planted out in the flooded paddy field from small bundles brought from the seed beds (see Plate 3). The broad-brimmed hats serve as a protection from the strong summer sun.

Plate 3. Seed bed and paddy field

The rice is sown thickly in the seed bed, where the seedlings remain until they are well established. They are then pulled up, tied in small bundles and transplanted in the paddy field.

Plate 4. Irrigation by tread wheel

The water is drawn from the river by a wooden chain carrying paddles, moving along a sloping trough. This is a view in the Central Yangtze Basin, and the Yangtze itself is out of sight on the right.

parts of China where the prospects for animal husbandry are good, and flocks of sheep are a familiar sight on the landscape (Plate 22). Emphasis in the future is likely to be on stimulating a livestock industry, the products of which would find a ready market in other parts of China, and on checking the process of breaking up for arable areas which are primarily adapted to grazing.

2. *The Winter Wheat-Millet Area*

This comprises the greater part of the Loess Plateaux in central and southern Shansi, Shensi, and south-eastern Kansu. The productivity of the land is strictly limited by the inadequate and unreliable rainfall and by the physical quality of the loess, which renders it liable to rapid erosion. In a good year, and perhaps one in ten is good, the rainfall of about fourteen inches is sufficient for agriculture, but in years of deficiency there is acute distress. Winter cropping is considerable (40 per cent.) and double-cropping is now becoming more important (18 per cent.).

The characteristic crops are winter wheat, millet, kaoliang, cotton, and maize. Corn is chiefly a spring crop, part of the millet crop is a summer crop planted after winter wheat, and the remainder a spring crop ; cotton and kaoliang are spring-planted crops. The warm summers make possible the growth of rice and cotton in the more sheltered valleys. The future of the area is bound up with the extension of dry farming, fertilization, and particularly irrigation, which would help to offset the effects of drought, so characteristic a feature of the past history of the region (Plates 13, 15, 16).

3. *The Winter Wheat-Kaoliang Area*

This covers essentially the great alluvial plains of northern China. It also includes Shantung, but the highland portions of the province and especially the hilly eastern promontory, exposed to maritime influences, really constitute a sub-region. The rainfall is about 24 in., summer temperatures are high, and there are seven months free from frost. This important area accounts for over a third of the total cultivated land in the country (Plate 14).

The major portion of China's wheat is grown here as a winter crop. It begins to sprout in the early days of February in the south, and at the end of the month in the north, and it is harvested at the end of May or the beginning of June. The spring crops are kaoliang, cotton, and some millet and maize, while millet, soya beans, and sweet potatoes are the summer crops. In Shantung, kaoliang is the

principal summer crop, and there is a noticeable increase in the number of fruit trees. Sub-tropical summer temperatures make possible the growing of rice and cotton in favoured regions. As in the winter wheat-millet area, the necessity for water conservancy is urgent. The future of farming largely depends on solving the colossal problem of the control of the Yellow river (see pp. 513–5).

4. *The Yangtze Rice-Wheat Area*

The Yangtze rice-wheat area covers the flat or gently undulating plains of the lower Yangtze in southern Kiangsu and southern Anhwei. The physical conditions are good with ample rainfall, high temperatures, and a high humidity which is accentuated by the large amounts of water in the lake basins. There is an almost continuous growing season with a short resting period in winter, and two crops a year are grown :

(i) The 'dry' crops such as wheat, barley, or beans, which are harvested in May or June, and thus have the advantage of the pre-monsoonal period.

(ii) The 'wet' crops, primarily rice, for which much moisture is required, are grown during the summer monsoon and harvested in the fall of the year.

Although a considerable amount of wheat is grown, rice is the principal and wheat the subsidiary production, whereas in the winter wheat-kaoliang area wheat is the crop upon which the farmers depend for a living. Double-cropping is common throughout, and nearly universal in the Yangtze flood plain. The rainfall favours this continuous cultivation because it is well spread throughout the year, but the great difficulty is in maintaining the fertility of the soil. The Central Yangtze Basin has a hot and humid summer, but the dry season begins a little earlier than in the lower Yangtze district. This is an important factor in the acclimatization of American cottons, which are apparently less tolerant of moisture in the later stages than Chinese varieties (Plate 17).

5. *The Szechwan Rice Area*

The famous fertile Red Basin, which is the chief granary of 'Free China' at the present time, forms by far the greater part of the Szechwan rice area. The factors affecting the types of farming are suitable for a variety of crops, and the crop combinations are in consequence extremely complex. The basin is sheltered, and its

southerly aspect gives it the full advantage of the warm summer sunshine. The humidity is high, and many sub-tropical plants flourish which are found elsewhere only in the south (Plate 12).

Rice is the chief crop, not only on the level ground but also on the terraced hillsides. Winter crops are the opium poppy, rape-seed, and wheat; spring crops are part of the rice and part of the maize crop; and summer crops, planted after the harvesting of the winter crops, are usually rice and maize. The most productive region is the densely populated alluvial Chêngtu Plain, characterized by an extraordinary variety of crops and a very intensive agriculture.

6. *The Rice-Tea Area*

This is a region of rolling hills, although it contains some low land along the rivers and around the Tungting and Poyang lakes. It covers primarily most of Chekiang and Hunan, southern Anhwei, central and northern Fukien, and all but the extreme south of Kiangsi. The soil basis is poor, but the high humidity and good distribution of rainfall are favourable for the rice and tea crops. The mist which forms on the hills is responsible for the development of the best teas. The growing season is normally about nine months, and the coastal areas are almost frostless. The type of farming is rice and rape-seed, with rice predominant, and tea an important crop on favourably placed hill-slopes. Winter cropping is prevalent in the northern, but not in the southern part; the amount of double-cropping is high, and intertillage of rice is usual in the warm plains of eastern Chekiang.

7. *The Double-cropping Rice Area*

This area is China's sub-tropical region *par excellence*, covering Kwangtung, eastern Kwangsi, and the southern extremities of Kiangsi and Fukien. The topography is hilly, but the climatic conditions, a good growing temperature throughout the year, a well-distributed rainfall, and a high humidity, are very favourable. The proportion of land cultivated is, however, low and irrigation is necessary on the hillside (Plates 18, 19).

This is pre-eminently the rice region with double- and sometimes treble-cropping. The third crop is often made possible by the influence of typhoon rainfall. The cropping system usually embraces winter dry crops, then the first rice crop during the July monsoon, and finally the second rice crop during the October typhoons. A number of tropical fruits such as pineapples, the famous lychee

fruits, and oranges are confined to this area. There is also a production of sugar cane and medicinal plants such as cinnamon and ginger.

8. *The South-western Rice Area*

The south-western rice area comprises high plateau covering most of Kweichow, Yunnan, and western Kwangsi. The climate is equable with a well-distributed rainfall and a long growing season with ten frost-free months. The topography is, however, difficult, and bad communications are a great handicap. As a result the proportion of the area cultivated (7 per cent.) is the lowest for all the agricultural units surveyed, and much of this is terraced and irrigated.

The major objectives of the farming economy have been rice and, until recently, the opium poppy. The poppy and broad beans are sown as winter crops. Rice is planted both in the spring as a first crop and in the early summer as a second crop after the poppy or broad beans. In many of the valleys a great deal of wheat and maize is grown up to 10,000 ft., and in places barley, oats, and beans up to 13,000 ft. The prospects for future development are good provided improved means of transportation are available. There are considerable areas of unutilized grazing lands and forests capable of supporting timber industries. Although it comes within the rice region the high elevation of the plateau makes possible the cultivation of temperate crops, including wheat (Plates 11, 20).

PRINCIPAL CROPS

In a country which is so largely devoted to arable farming it is natural that a considerable variety of crops should be produced. The principal crops are those which can be used directly for human food, especially the grains, beans, and vegetables. Little land is available for the growing of fodder to be used in the feeding of animals, even when they are kept for draught purposes. Yet, in spite of the predominance of a system which aims at obtaining the greatest amount of food possible per unit of land, the country is not self-supporting in essential foodstuffs, and there have been considerable imports from abroad. On the other hand there is an important production of commercial crops such as cotton, silk, tobacco, and opium, which are partly used on the farm for domestic purposes and partly sold for cash. The agricultural output thus consists of the two main categories of food crops and commercial crops.

Rice

Rice is essentially a subsistence crop. It is the staple food crop in Central and South China, and even in the north, where very little is grown, is an important article of diet. The characteristic crop is ' wet ' rice, which requires a long period of abundant moisture com-

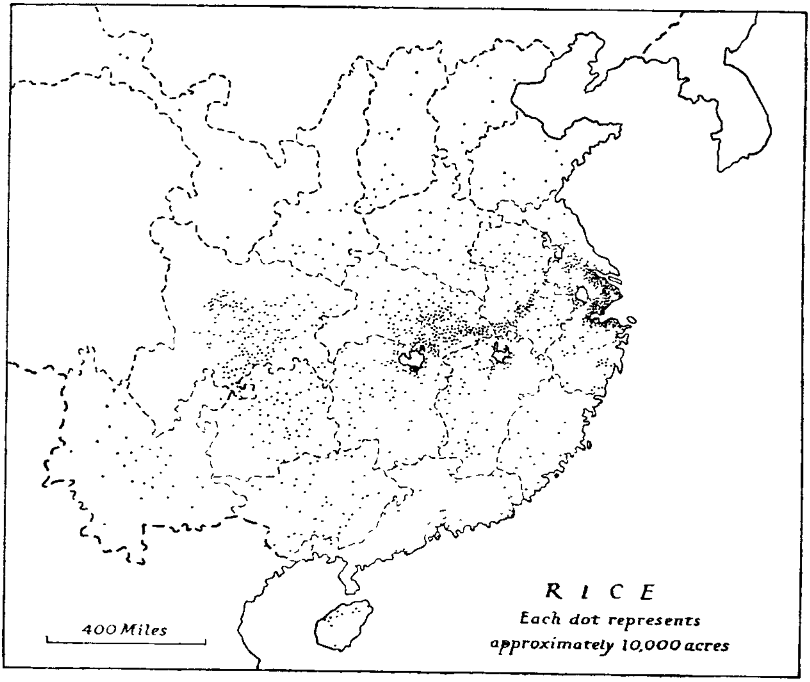

Fig. 7. Distribution of rice

Based on Cressey, G. B., *China's Geographic Foundations*, p. 92 (New York, 1934). The distribution of rice in China is very closely related to climatic and soil factors. Where there is sufficient water it will grow even in the wheat region, but there the available moisture is so limited and so uncertain and the soil so porous that rice in North China is restricted to a few favoured localities. South of the Tsinling shan-Hwai ho line the rainfall increases rapidly in amount and decreases in variability, while the soil becomes heavier and the subsoil less pervious, and the high humidity diminishes evaporation from the paddies. Because of its relatively high yield and its traditional place in Chinese agriculture, rice is grown on all land where water is available, even in cases where it would probably pay the farmers to develop the cultivation of non-irrigated crops.

bined with high temperatures, conditions which are found pre-eminently in the south. The rice is planted out from its original seed beds, and must be flooded with water and constantly tended. Given the right conditions it is extremely economical, and no other

tropical grains yield so large an amount of food value from a given area of land (Plates 2, 3, 7, 8, 9).

The most important region is the great valley of the Yangtze with its series of fertile lake-basins. In Szechwan the alluvial Chêngtu Plain is especially favoured; and farther to the east, the Central Yangtze Basin and the moist, hot Han valley are also devoted to rice culture. Lower down the main river the plains of southern Anhwei, Kiangsu, and northern Chekiang, which constitute the Yangtze delta as a whole, are all rice areas; but perhaps the most outstanding producing regions are found in the great alluvial flats of Hunan and Kiangsi. In the south, the delta and flood plains of the Si kiang are important, and there is considerable production in the small coastal lowlands and valleys of Kwangtung and Fukien (Fig. 7). In all these areas rice is grown intensively, giving one crop a year in the Yangtze valley, and two or even three in the extreme south. The average yield per acre is 67 bushels, nearly twice the world average. Elsewhere it is produced only under conditions of elaborate cultivation, as in the valleys of Yunnan and in sheltered localities of the north. Annual production is high, and China ranks among the leading rice-growing countries of the world.

World Production of Rice and Wheat, 1936 (*millions of quintals*)[1]

Rice		Wheat	
China	480	China	231
India	496	U.S.S.R.	309
Japan	125	U.S.A.	171
Burma	72	India	96
French Indo-China	63	France	69
Siam	34	Argentina	68
All Africa	21	Canada	60
All South America	16	Australia	41
U.S.A.	10	U.K.	15
All Europe (without U.S.S.R.)	12	All Europe (without U.S.S.R.)	442

Source: *Statistical Year Book of the League of Nations*, 1938–39, tables 27, 33 (Geneva, 1939).

[1] Statistics of quantity and value are quoted in quintals and dollars (Chinese National Currency dollars) respectively; in 1936 the equivalents were:

1 National Currency dollar	$14\frac{3}{8}$ pence sterling
1 quintal	200 market catties (220·5 lb.)

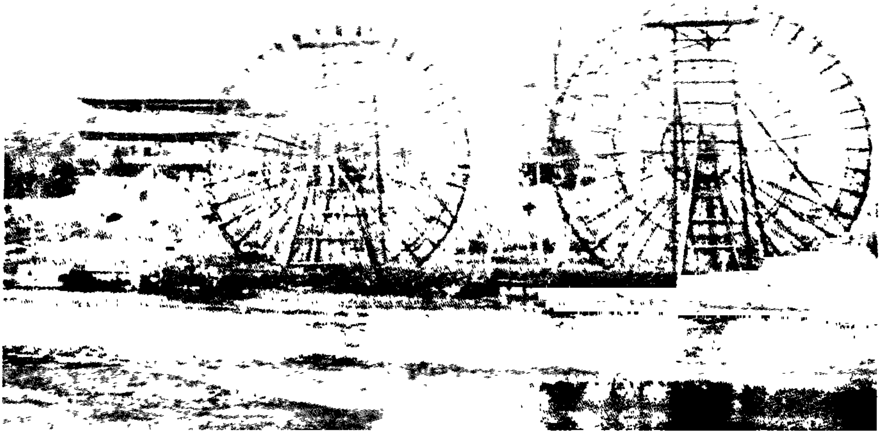

Plate 5. Irrigation by water wheels

These wheels, made of bamboo, are about 40 feet in diameter. This scene is in the Red Basin outside Chêngtu, but wheels of similar type are common in the rice area.

Plate 6. Irrigation by swinging basket

A simple and widely used method of irrigation in ricefields.

Plate 7. Ploughing field for rice

The Chinese plough is of a primitive wooden type, and is normally drawn by the sturdy water-buffalo, better adapted than the ox to conditions in the flooded ricefields.

Plate 8. Harvesting rice

The rice is cut by sickles and loosely stacked preparatory to threshing.

The output, however, is insufficient to meet the demands of the population, and in normal years considerable quantities are imported from Burma, French Indo-China, and Siam. Up to the outbreak of war in 1937 the general trend of imports had been downwards, indicating increased domestic yields as a result of technical improvements.

Value of Imports of Cereals (millions of dollars)

	1932	1933	1934	1935	1936
Rice and paddy . . .	185·8	150·8	65·7	89·6	26·7
Wheat.	80·7	88·0	31·8	34·9	11·8
Wheat flour	55·2	27·8	7·1	6·0	4·7
Other cereals and flour . .	7·9	9·3	7·1	5·4	6·0
Total	329·6	275·9	111·7	135 9	49·2

Source: Maritime Customs, *The Trade of China*, successive issues (Shanghai).

Wheat

Wheat, like rice, is raised in all parts of the country, although North China is much the most important area and little is grown south of the Yangtze. Except in the north-west it is mainly autumn sown, and in consequence of its good yield and high quality meets with little competition from other winter crops. It is also an important cash crop, and in the north, where millet and kaoliang are additional constituents in the diet, nearly one-third of the output is sold.

The chief centres of production are the North China Plain, northern Kiangsu, and the Wei ho valley (Fig. 8). Cultivation has also increased rapidly in Manchuria, where the crop is planted in the spring and harvested in August. This region may serve as a future granary for China. Prior to the Japanese occupation in 1931 there had been a large migration of settlers from the densely peopled plains of Hopeh and from Shantung, and many thousands of acres were added to the crop area yearly (Plate 13).

As will be seen from the table on p. 18, China is an important producer of wheat (231 million quintals in 1936) and is only exceeded in total output by the U.S.S.R. It is made into flour, which is commonly eaten in the form of an alimentary paste resembling noodles or spaghetti. Production does not cover domestic needs, and a certain amount has to be imported. There are, however, indications that China is becoming more self-sufficient than in the

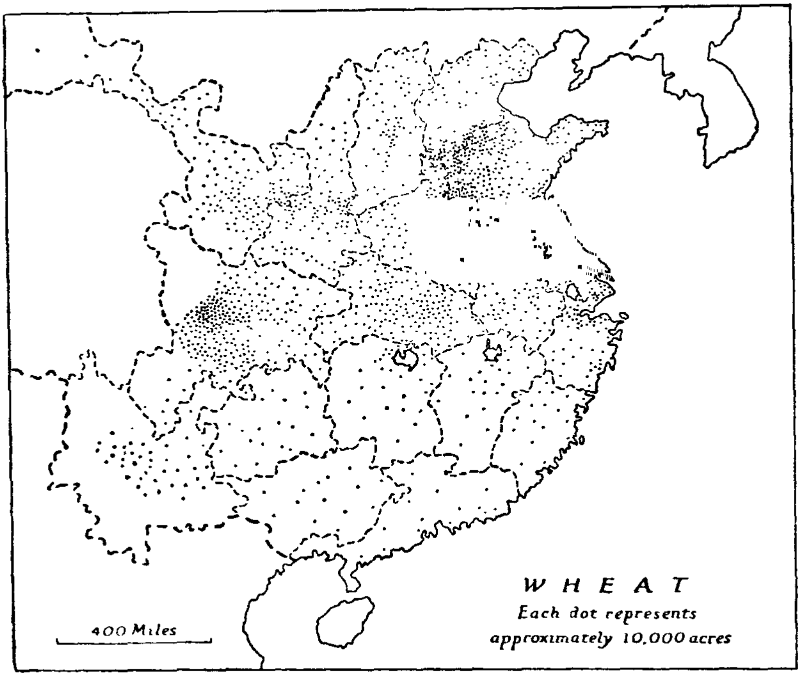

Fig. 8. Distribution of wheat

Based on Cressey, G. B., *China's Geographic Foundations*, p. 94 (New York, 1934). Wheat is the most important of all crops in North China, where it is generally sown in winter. It is planted, however, as a spring crop in Kansu and in northern Shansi and Shensi, where the winter conditions are severe. In the rice region wheat is replaced by rice as the chief cereal, but is the principal winter crop.

past. Imports of Australian wheat fell from 966,000 quintals in 1936 to 430,000 in 1937, and there were no important deliveries from any other country.

Kaoliang and Millet

The grain sorghum (kaoliang) ranks next in importance to wheat in the north, though it has a somewhat narrower distribution. It grows to a height of 8 or 10 ft., somewhat resembling American broom corn with a frond of kernels at the top. The grain is the size of a small pea and of a brownish colour. The plant is well adapted to the northern plains, because it is a summer crop and can withstand the rigorous conditions of poor soil and inadequate rainfall. The poor soil zones which border the Gulf of Pohai and the low plain of the Hwai ho are the important growing centres, and

large amounts are also obtained around Taiyuan (Fig. 9). Kaoliang is usually sown in association with soya beans, or occasionally with field peas or cowpeas. Near Peiping it is planted between widely spaced rows of wheat, and when the latter is harvested, soya beans are planted in the rows that the wheat occupied. Kaoliang is almost

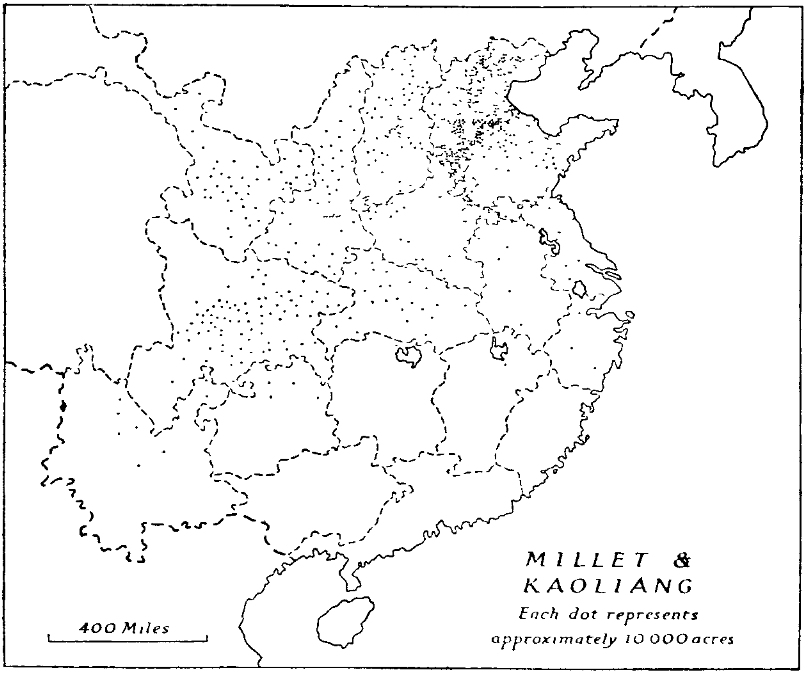

Fig. 9. Distribution of millet and kaoliang

Based on Cressey, G. B., *China's Geographic Foundations*, p. 93 (New York, 1934). The greatest concentration of millet is in Shansi and in western Hopeh, but it is a typical crop of the northern half of the wheat region because of its adaptability to conditions of drought, cool temperatures, short growing-season, and low fertility. Kaoliang is an important summer crop in the winter wheat-kaoliang area, with concentrations in eastern Hopeh and in central Shansi; farther south its cultivation is limited by the competition of rice.

entirely consumed in the areas of production, where it forms an important article of diet and is often preferred to other crops because of the many uses, such as fencing and thatching, to which its stalks can be put (Plate 14).

Millet of different drought-resisting varieties replaces kaoliang in the drier and higher parts of the wheat region. The greatest relative concentration is found in the mountains of Shansi, where it is often grown with soya beans, and in western Hopeh. Millet and kaoliang

are also found planted together. In some places in the north and west the area planted to millet varies from year to year, depending on the rainfall and soil conditions about the time of planting. Land that has just had the wheat stubble ploughed up may be fallow if the rainfall is inadequate, but if the June and July rains are good, millet may be grown. The crop is used largely for human consumption on the farm, little is sold, and only very small amounts are fed to animals.

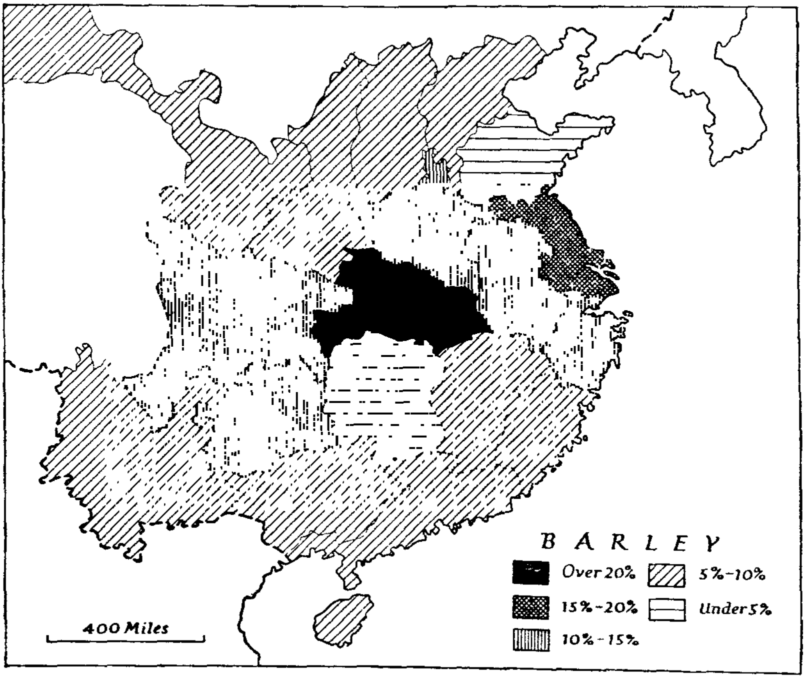

Fig. 10. Distribution of barley

Figs. 10–15, which are based on statistics in Chinese Ministry of Information, *China Handbook*, 1937–1943, pp. 561–78 (New York, 1943), show the percentage of the total crop area occupied by different crops, 1931–37 average. The main barley-growing area is in Central China, along the Yangtze, where there is a marked tendency towards specialization in certain localities.

Barley

Barley has a wide distribution over most of the country, though the lower Yangtze valley is the main producing area (Fig. 10). It is often planted with field peas or broad beans, and in Central and North China the two crops may be harvested together. In parts of the Yangtze basin the field peas may ripen some ten days earlier

than the barley, and may be separately pulled. In times of crop failure barley is favoured, because it ripens early and supplies the first food grain of the season. Most of the crop is consumed as human and animal food on the farm, and some is used as a green manure on the ricefields.

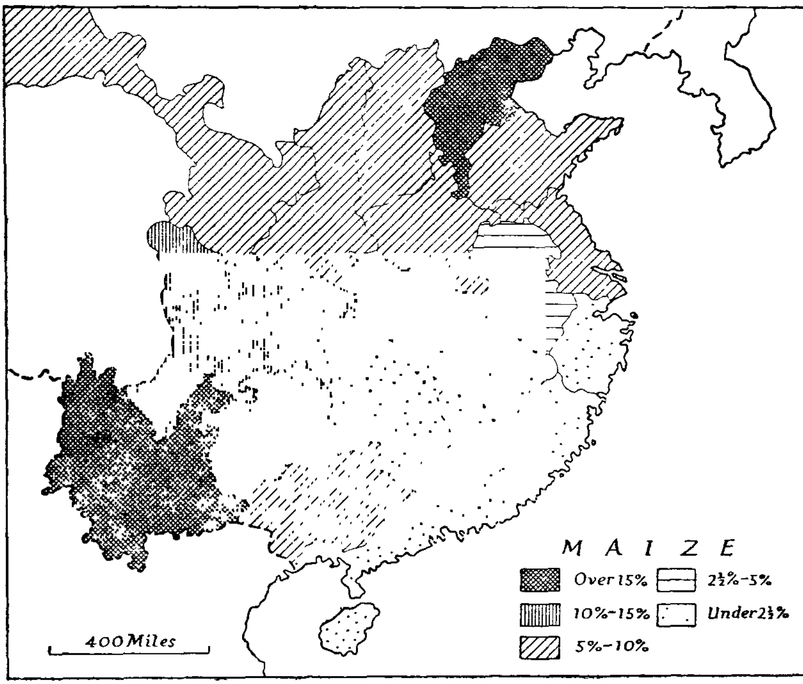

Fig. 11. Distribution of maize

This map indicates the unusual distribution of maize along a broad SW–NE belt.

Maize (Corn)

Maize has been grown in China from very early times, and has a distribution which differs from that of any other crop. It lies in a broad belt extending from north-eastern Yunnan to Hopeh, its eastern limits coinciding closely with the topographical boundary between the western highland and the eastern lowland (Fig. 11). Climatic and soil requirements and the competition of other crops are the main factors governing this distribution. A warm moist summer, a rather rich, loamy soil, and the absence of water on the hillsides for rice culture favour maize production. It is mainly a subsistence crop, more so in the north than in the south, where over a quarter of the annual yield is sold (Plates 11, 12).

Buckwheat

In the colder, drier regions of the north and west buckwheat is sometimes grown after wheat, when the summer rainfall is not deficient. It is also sown as a spring-planted crop in places of high elevation. Within the Yangtze valley it is usually grown on dry land as a summer crop, but may also be planted in years of low rainfall on the higher irrigated lands which are normally devoted to rice.

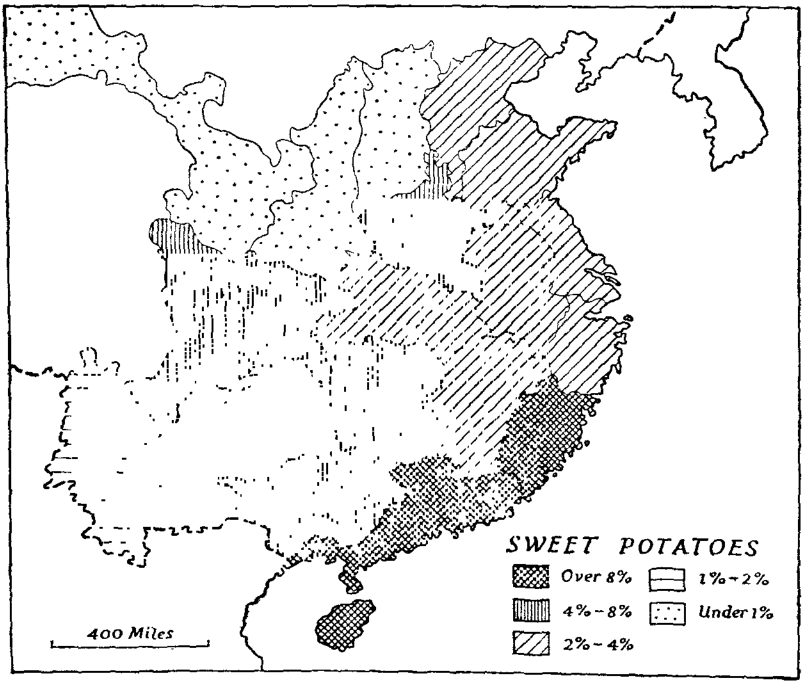

Fig. 12. Distribution of sweet potatoes

Sweet potatoes are grown under a wide variety of soil and climatic conditions, but there is a marked concentration in the south-east.

Sweet Potatoes

Sweet potatoes were introduced into Fukien from Manila at the end of the sixteenth century, and in recent years their cultivation has expanded rapidly at the expense of such crops as millet, kaoliang, and soya beans. They are grown throughout China with marked local concentrations in the north-east, south-east, and particularly in Szechwan (Fig. 12). In the sandy districts along the south-eastern coast the soil is unsuitable for rice, and sweet potatoes are

the chief source of food supply, being planted in rotation with peanuts. Their importance in the nation's dietary is likely to increase, since they provide more food per acre than any other major crop in China except rice and wheat.

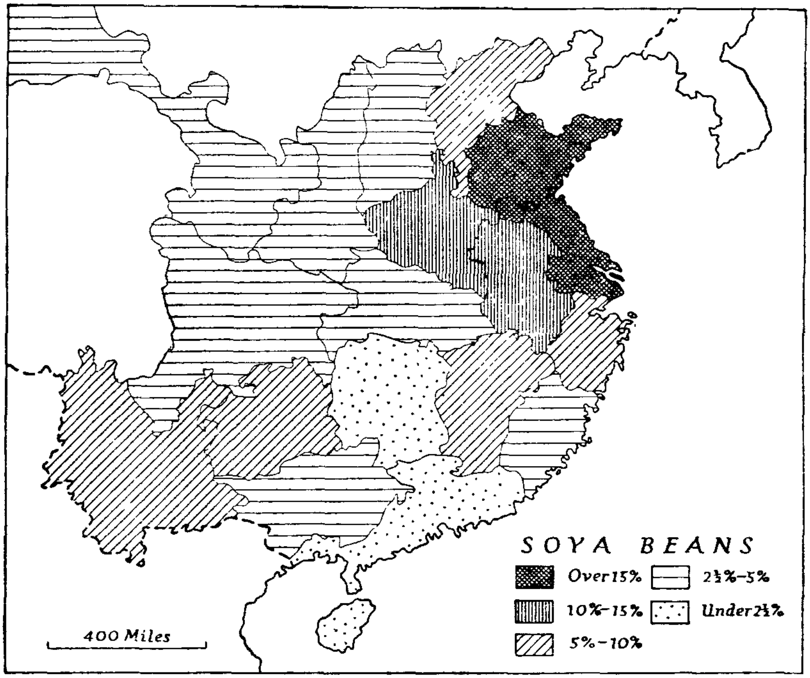

Fig. 13. Distribution of soya beans

Soya beans are grown in almost all parts of China, but are most important in the plains of the winter wheat-kaoliang area.

Leguminous Plants

Leguminous plants are important in a country where the arable land is intensely cultivated and the diet deficient in animal food, particularly fat. In addition to supplementing the food basis they improve the soil by enriching the nitrogen content, and thus play their part in the crop rotation.

Of outstanding importance is the soya bean. Although the main centre of production is Manchuria, it is now grown throughout China, and is most important on the plains of the winter wheat-kaoliang area (Fig. 13). The plant is normally just over 2 ft. high, and usually produces from forty to as many as a hundred pods in a good year. It is generally used as a summer crop, often following

after winter wheat or barley. Owing to its leguminous character it can also be grown in association with kaoliang, millet, or maize, or even sometimes in the ricefields. The bean can be used for human food, for animal food, and for manufacturing purposes. Rich in oil, protein, and phosphorus, it forms a most versatile food resource; and bean meal, properly treated, provides a sort of milk substitute from which curds and a kind of cheese can be made.

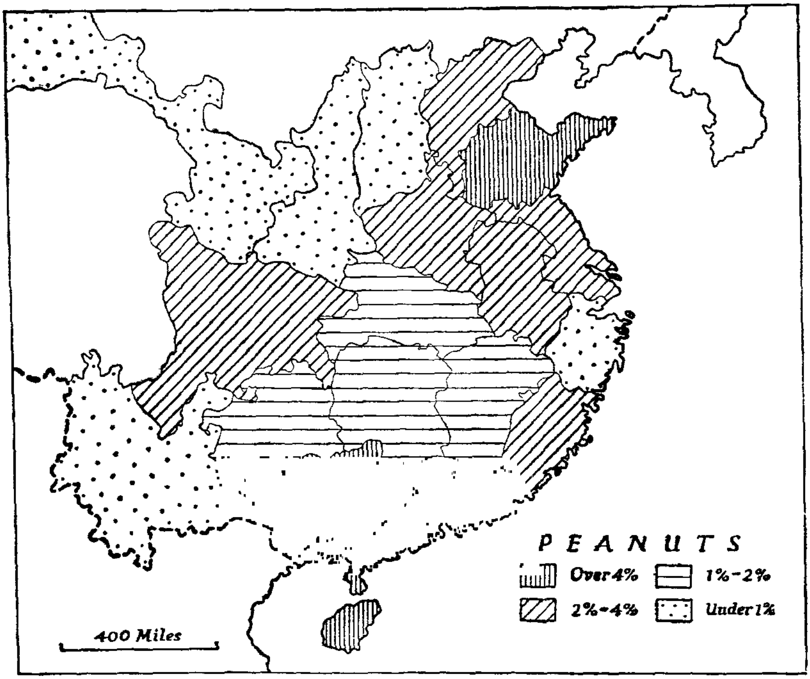

Fig. 14. Distribution of peanuts

Peanuts, an important cash crop, have a wide distribution on sandy soils, especially in the north-east and south.

For industrial purposes the oil is used for waterproofing cloth, lanterns, and paper umbrellas, and in the manufacture of soap, paint, margarine, and lubricants. The bean cakes serve as feed for cattle and pigs, while anything that remains is employed as an artificial manure.

Second only to the soya bean as a producer of oil is the earth-nut or peanut. The plant has a wide distribution, with its chief centre of dispersion in the north, where some of the main areas are located in the sandy alluvial deposits which mark the old courses of the Hwang

ho. It is also grown in great quantities in the less fertile parts of Fukien, and Lwanchow is said to produce the best peanuts in the Far East (Fig. 14). Owing to the high content of oil, there is a world demand for peanuts, but the bulk of China's production is consumed locally. In central and southern China, rape tends to replace the above plants as the chief source of vegetable oil. In southern China,

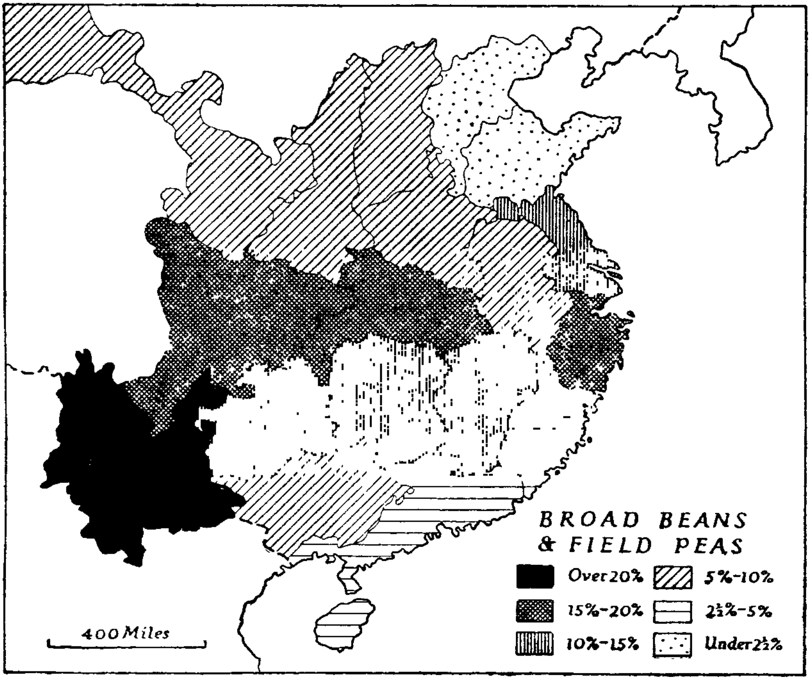

Fig. 15. Distribution of broad beans and field peas

Both broad beans and field peas are widely used for interplanting with other crops, but are most important in the Red Basin and the south-west.

too, the lacquer tree is oil-yielding, though in this case the oil is derived from the latex and not from the seed.

Other peas and beans have a wide distribution throughout the country (Fig. 15), but play a minor part in the farming economy. Field peas are grown in most localities as a winter crop, with the largest concentration in the Red Basin of Szechwan. They are often planted with barley or wheat, and the two may be harvested together, and in some places are ground into meal together. Broad beans are produced over a wide area, but are among the major winter crops

only in districts along the Yangtze and on the Yunnan plateau. They are a popular article of diet, eaten green or out of hand after roasting. The green beans of the vetch, which is grown in gardens in the north and as a winter crop in the south, are also used for human food.

Cane Sugar

The cultivation of sugar, which is China's most important tropical crop, is almost confined to the southern provinces of Kwangtung, Kwangsi, and Fukien, where it is chiefly a dry land crop rotated with sweet potatoes or peanuts. In Szechwan it is usually planted on the lower terraces, where it can be irrigated. China is not self-supporting, but planting has recently increased and imports fell from 8,703,000 quintals in 1929 to 1,585,703 in 1936.

Fruits

Fruit farming is a relatively recent development, and plays a small, but not insignificant, part in the food supply. In the north the pear and apple are grown extensively, and the peach and apricot are widespread in Shantung. Characteristic of the southern part of the country are tropical and sub-tropical fruits such as persimmon (which is also grown in the north), the grape, the lychee, and the pomegranate. There are also said to be about eighty varieties of oranges in South and Central China, and the mandarin orange has a particularly wide distribution.

Cotton

The physical and climatic conditions of China are favourable to the production of a wide variety of raw materials for the textile industries; the chief limitation being the necessity of devoting the greater part of the cultivable area to food crops.

Cotton is the most important of China's commercial crops, and provides the raw material for the most successful of her textile industries. Within China are to be found climatic conditions broadly comparable to the American 'cotton belt.' The temperatures are everywhere suitable for the growth of cotton (mean of 77° F. in June, July, and August), but rainfall is a limiting factor, more than 60 in. per annum being in excess and under 15 in. insufficient. This means that the best conditions are found in the Yangtze valley and in parts of North China, where a humid summer is followed by a dry period when the cotton boll is exposed. The Yangtze

valley is on the whole rather moister in autumn than the American 'cotton belt,' and while Chinese varieties are acclimatized to it there is difficulty in adapting the American variety. There is, however, a slight but important difference between the Hupeh

Fig. 16. Gathering cotton

Based on a reproduction of a Chinese engraving in Sion, J., *Géographie Universelle*, tome ix (*Asie des Moussons*), première partie, p. 161 (Paris, 1928).

basin and the Yangtze delta, the dry season coming earlier in the former. The plant thrives in the light, silty soils of the lower Yangtze, and the newly reclaimed maritime belt of south Kiangsu is almost entirely devoted to cotton.

The eastern part of the Yangtze basin (Kiangsu, Chekiang, Hunan, and Hupeh) is then the most important area, though since 1930

there has been a great increase in the output of the northern provinces (Hopeh, northern Shantung, northern Anhwei, Shensi, and southern Shansi), which were credited in 1936 with producing just over half of the total cotton crop of the country (Fig. 17). Chinese cotton, though generally coarse, short-stapled, and unsuitable for fine spinning purposes, has many desirable qualities, possessing a hard,

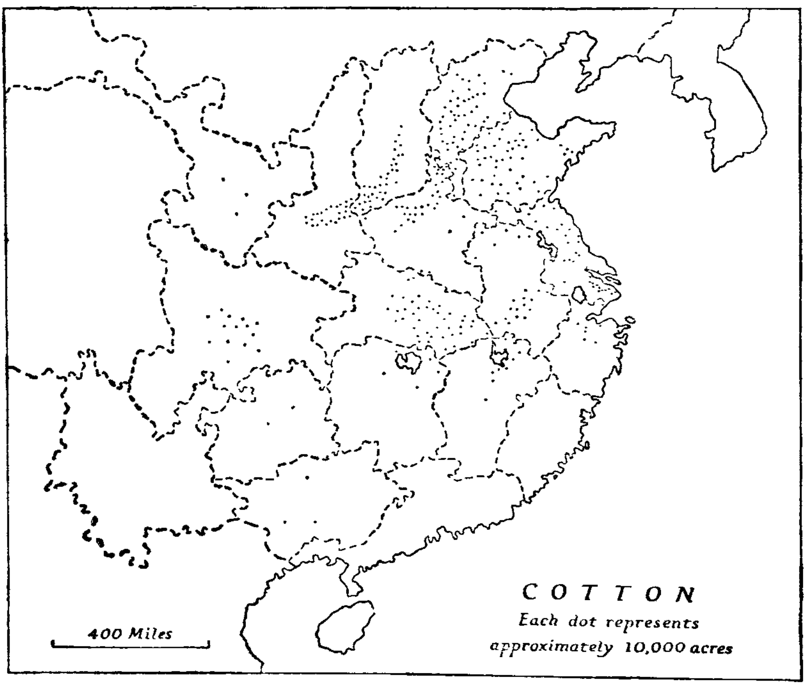

Fig. 17. Distribution of cotton

Based on Cressey, G. B., 'Agricultural Regions of Asia': Part VI, 'China,' *Economic Geography*, vol. x, p. 125 (Worcester, Mass., 1934).
The concentration in the chief cotton-growing areas of Kiangsu, Hupeh, Szechwan, the Wei ho valley and Hopeh is well marked.

strong, and beautifully white fibre. The improvement in the quality of cotton grown, which can be achieved only by the careful selection of suitable species, will therefore be of vital importance in the future. Attempts have been made, with considerable success, to introduce American cotton, which constituted a little over 50 per cent. of the total crop acreage in 1936. This type matures, however, four weeks later than the Chinese variety, and it was found that the greater humidity of the Yangtze valley in autumn stimulated the destruction

of the plant by fungus diseases. American cotton has thus been grown with much more success in North China and in the Hupeh basin and the upper Han valley, where the autumns are relatively dry. By 1937 American cotton was giving a yield some 10 per cent. to 30 per cent. higher than that of the native variety.

Until the end of the war of 1914–18 China was an exporter of raw cotton, but later there was an import surplus. This was caused partly by unstable political conditions in China which led to a decline in production, and partly to the growing demand of the native cotton industry for better quality raw material. The volume of imported cotton reached its peak in 1931, when for the first time raw cotton superseded cotton goods as the country's principal import. Since then the extension and improvement of native cotton have led to a steady decline in purchases from abroad. In 1936 China was the largest producer in the world after the United States and British India. Total production was approximately 8,500,000 quintals of ginned cotton, or nearly one-eighth of the total world production.

World Production of Ginned Cotton, 1936 (*millions of quintals*)

China	8·5
U.S.A.	26·9
India	11·6
U.S.S.R.	7·8
Egypt	4·1
Brazil	3·9

Source: *Statistical Year Book of the League of Nations,* 1938–39, table 55 (Geneva, 1939).

As a result the country had become practically self-sufficient with regard to supplies of raw cotton, and imports were confined to specialities, mainly from British India, and to a less extent from the United States and Egypt. The trend is apparent from the following figures: as recently as 1931 China imported 2,800,000 quintals of raw cotton; in 1932, 2,200,000 quintals; in 1934, 1,100,000 quintals; and in 1936 only 400,000 quintals.

The National Government has devoted special attention to the cultivation of a crop which not only supplies manufacturing industries with important raw materials, but also provides the peasantry with a useful supplementary form of income. It is generally considered that the future is bound up with the encouragement of cultivation and crop improvement, and the extension of co-operative marketing and financing facilities.

Silk

Sericulture is China's oldest industry, and in spite of its recent decline it still ranks second to cotton in furnishing material for industrial purposes.

Silk, derived from the silkworm which feeds upon the leaf of the white mulberry tree, can be produced where this tree flourishes. The mulberry has a wide distribution, but the best qualities of raw white silk come from Kiangsu and Chekiang, which are the main centres of silk production. Less important centres are found in Shantung, Szechwan, and Kwangtung. Wild or tussah silk is obtained from worms which subsist on oak leaves in Shantung, eastern Honan, southern Hopeh, and the plateau of Shansi.

Silk production, particularly the manufacture of tussah or pongee silks, is still partly a cottage industry, providing the peasants with an auxiliary income. China was formerly the most important world producer, but she failed to adapt herself to changing conditions, her methods remained backward and out of date, and in face of Japanese competition she yielded pride of place. Japan possesses less favourable physical conditions, but early adopted European inventions, and the bulk of the silk is reeled not by hand but by steam filatures. The use of substitutes (rayon), and the decline in world (particularly American) demand for a luxury production like silk during the years of depression, have also acted adversely upon the export trade (Fig. 36). Exports are not large, and in 1936 amounted to 30,700 quintals (value $31,000,000), the bulk of which went to the United States, France, and French Indo-China.

In 1934 the National Economic Council organized a Sericulture Commission, with a programme beginning with the improvement of seeds, and continuing on the industrial side with the reeling and marketing of silk. The improvement of seeds is a fundamental measure, and large quantities of mulberry sprouts were in fact distributed gratis to the farmers of Chekiang and Kiangsu who had uprooted their mulberry trees during the depression to make room for more profitable plants. There is some variation in the quality of silk cocoons, but the filament is usually small and well suited to reeling. On the other hand, many of the silkworms are tainted since they are hatched from home-made cards, and there is a recognition that egg cards need to be improved. Even so, China undoubtedly has great natural advantages for the production of this textile raw material, and if modern methods are introduced she may regain her former dominant position.

Plate 9. Threshing rice

The sheaves of rice are beaten against a screen placed in a large fan-shaped box, which catches the grain as it falls.

Plate 10. Threshing grain

A scene in a small village near Kunming.

Plate 11. Maize drying on frames, Yunnan

Plate 12. Maize and rice, Hupeh
Crops of maize and rice at an elevation of 7,200 ft. in the mountainous part of western Hupeh.

Hemp, Jute, and Ramie

The most important of the remaining fibres produced in China are hemp, jute, and ramie. Hemp, which has been cultivated for many centuries, is exported mainly from the Yangtze and the northern ports, while jute comes mainly from eastern Szechwan, Hopeh, and Kwangtung. Ramie (rhea or China grass) is cultivated in Hupeh, Kiangsi, Hunan, and Szechwan, three crops being obtained per year.

Tea

Although China has long been famous as a producer of tea, and at one time held a world monopoly, the industry has declined in importance in recent years. It is, however, still grown extensively, and the finest quality comes from Kiangsi and Hunan, where it is cultivated on the dry, sunny hillsides. The South-Eastern Uplands, Kwangtung, and the Red Basin of Szechwan are less important producing areas. The leaves are picked three times a year—in April, in May, and in August or September. Black teas are more common than the green variety, the difference being largely a matter of curing.

At one time the tea trade was the easy way to wealth and prosperity, and Foochow developed as the port for the famous clippers of the nineteenth century. As far back as 1867 exports amounted to 175,000,000 pounds, and expanded still further to 295,000,000 pounds in 1886. Since then the competition of other producing areas has been felt, and the total export in 1935 was only 78,000,000 pounds (value $30,000,000). The chief markets were the U.S.S.R., Morocco, the United Kingdom, and the United States, the United Kingdom taking a large proportion of the black teas and Morocco of the green teas.

The decline in the fortunes of the tea trade was largely due to the failure of the Chinese to adopt modern methods of production and organization. In China it has remained a peasant industry cultivated in small plots by peasant labour. As a result it has failed to hold its own with the highly organized plantation industry of Ceylon and Assâm, where, also, the initial processes of manufacture (winnowing, firing, etc.) are performed in well-equipped factories on the tea estates. If it is to remain a peasant industry in China—which on social grounds is desirable—and at the same time capable of competing with the plantation-grown tea of India and Ceylon, it can only be on a co-operative basis. Even so, it is doubtful whether China can recapture the markets of the principal tea-drinking countries, accustomed to the stronger flavoured Indian teas.

On the other hand there is an enormous demand within China, and a market capable of great expansion in the adjacent parts of Asia (Tibet, Mongolia, and U.S.S.R.). The National Government, aware of the need for reorganization, took preliminary steps in May 1937 when it set up the China National Tea Corporation to bring about the revival of the tea industry and the promotion of the tea trade.

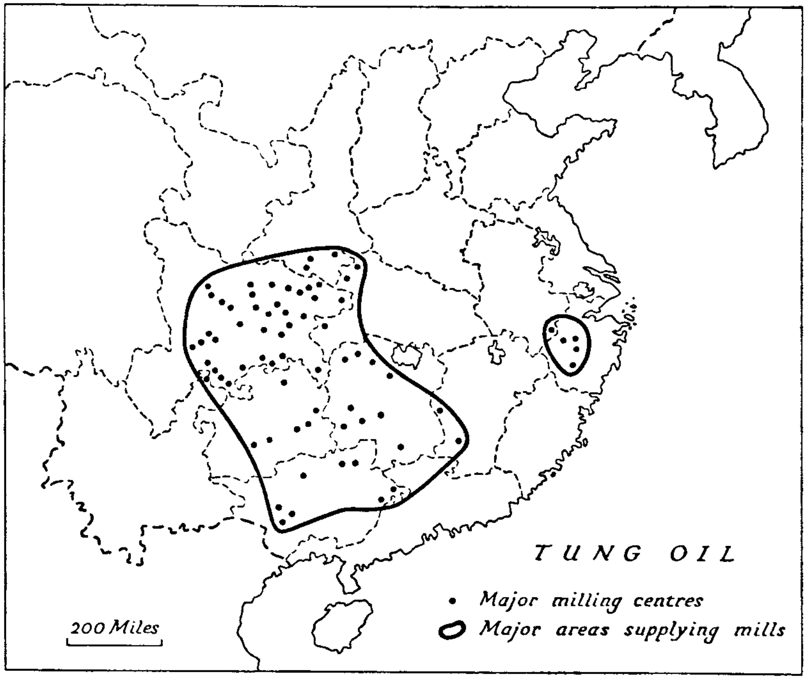

Fig. 18. Distribution of tung-oil (wood-oil)

Based on Deasy, G. F., 'Tung Oil Production and Trade,' *Economic Geography*, vol. xvi, p. 265 (Worcester, Mass., 1940).

The major tung-oil-producing provinces are Szechwan and Hunan; Kwangsi, Hupeh, and Chekiang are of less importance. The production of tung-oil in Kweichow is greater than the map would indicate, since much of the crop is moved downstream to milling centres in Szechwan and Hunan.

Tung-oil (Wood-oil)

Tung-oil has assumed a position of considerable commercial and industrial importance in recent years, and now ranks as one of the world's essential raw materials. It is the best drying and water-proofing oil of vegetable origin known to science, and in its production China has a virtual world monopoly.

The oil is derived from the seeds of the tung-oil tree, which grows in the wild and semi-cultivated state in western and southern China. The trees thrive on hill slopes up to 1,500 ft., provided they have enough warmth and moisture and no winter temperatures lower than a few degrees of frost. These requirements limit them to the rice region, and the major oil producing provinces are Szechwan and Hunan, while Kwangsi and Hupeh are of lesser importance. A small detached centre is located in Chekiang, but its output is relatively insignificant (Fig. 18).

The main areas in Szechwan and Hunan generally consist of a group of tung-oil milling centres, and a single major collecting and trans-shipment point. Attempts to establish modern centralized tung mills have failed, and innumerable small primitive local mills continue to account for the greater part of the Chinese tung-oil press. In peace-time from 80 to 90 per cent. of China's export of tung-oil is collected at and exported from Hankow, and the bulk of the remainder is handled by Hong Kong. Exports reached a record high level in 1937 at 1,029,000 quintals (value $89,800,000) as compared with 867,000 (value $73,400,000) in 1936. The United States, which uses large amounts in the paint and varnish industry, took over 60 per cent., followed by Germany, France, and the United Kingdom. Experimental planting of the tung-oil tree has been undertaken in America, especially in northern Florida, and in Burma, South Africa, Brazil, and Paraguay, but even so China produced 98 per cent. of world production in 1938.

Tobacco

Tobacco is widely distributed in most of the provinces of China, and the most important areas are in Shantung along the railway line near Weihsien, in central Honan, in Kwangtung, and Fukien. In Kwangtung the large tobacco crop is generally planted in irrigated land after the harvest of the late rice crop, while farther north it is sometimes grown in association with cotton, peppers, or sweet potatoes. The area under cultivation has increased in recent years, and in 1936 there was an important export trade valued at $10,000,000. It is, however, doubtful whether the peasants have derived much benefit, since the marketing of the leaves has been largely controlled by commercial and industrial capital, and the bargaining power of the producers is very poor. Tobacco smoking is common among the peasantry, and in recent decades cigarettes, which are produced in modern factories, have also become very popular.

Medicinal Plants

Opium Poppy. The growing of opium has been affected by the prevalent political conditions and has gone through certain well-defined phases. In the early years of the Chinese Republic there was a strong movement to reduce and even to stamp out domestic production. Cultivation, however, revived during the war-lord period, when farmers in many of the provinces were forced by the military authorities to raise opium for taxation purposes. Moreover, opium gives a quick financial return, and during this period there was a dangerous tendency for peasants to give it precedence over the more vital and more necessary food crops. Under the National Government the campaign against opium cultivation has continued, and in 'Free China' the area under such cultivation has been greatly reduced. In the occupied territories, on the other hand, the Japanese have done little, if anything, to discourage the consumption of opium and other narcotics, preferring the easy profits to be derived from this trade to the welfare of the Chinese people.

Other Medicinal Plants. Of other medicinal plants, the most important are camphor and spices. Camphor trees are widely distributed in the warmer parts of the country, and the main centres of the industry are in Fukien and Kiangsi. In the west, particularly in Yunnan, there are large areas of camphor trees which prior to the war with Japan had not undergone any considerable exploitation. Of the spices, cassia (cinnamon) oil, obtained from the bark of a tree which grows in abundance in South China, and ginger, obtained from Kwangtung, are products of commercial importance, and both are used for scenting tea and preparing cosmetics. Most of the medicinal plants and spices are grown in tropical South China.

Seeds

Seeds such as castor seed and linseed are frequently grown, but sesamum seed is the only major export. Sesame is grown widely throughout North and Central China, and yields a fragrant cooking oil. The seeds are sent mainly to the United States, where they are used for oil-crushing, bakery, and confectionery purposes.

LIVESTOCK

Throughout the greater part of China Proper animal husbandry is for the most part a side line of arable farming. Draught animals like oxen, water buffaloes, and horses are reared for cultivating and

transport purposes, swine are raised in large numbers, and together with poultry seem to be in evidence on every farm, being used partly as a source of fertilizer and partly as the basis of the meat supply. In the semi-arid areas of the north-west, sheep, cattle, yaks, and goats are numerous, and provide the Mongol and Tibetan tribesmen with most of their day-to-day requirements.

Cattle (Oxen and Water Buffaloes)

Within China Proper, cattle are used primarily for draught purposes. There is a certain amount of grazing and dairying in the dry north

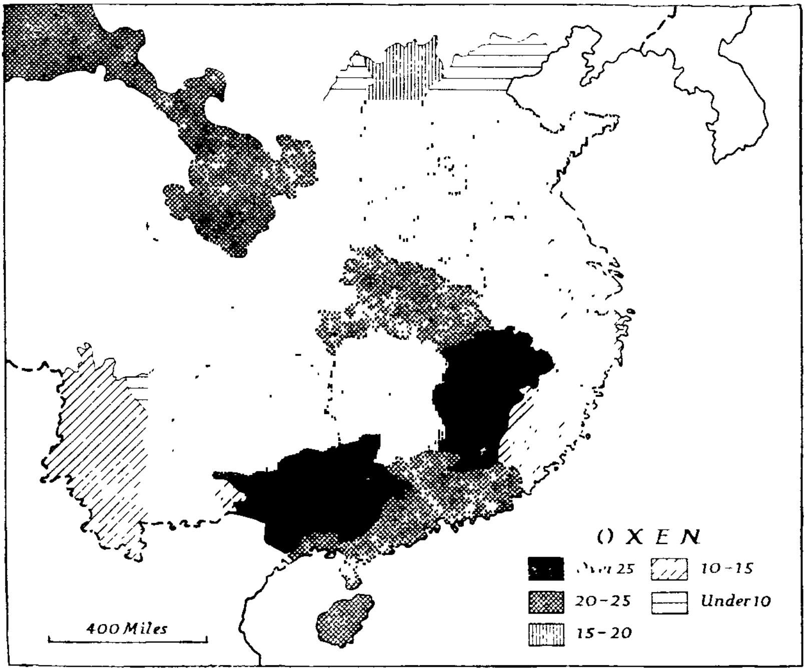

Fig. 19. Distribution of oxen

Figs. 19 and 20, which are based on statistics for 1937 in Chinese Ministry of Information, *China Handbook*, 1937–1943, pp. 579–80 (New York), show the number of oxen and water buffaloes respectively per acre of cultivated land.

and west, but it plays a very minor part in the agricultural life of the nation. The main concentrations of cattle are found in the central and southern provinces, where the stolid water buffalo is adapted for work in the irrigated rice fields (Plates 7, 21), and requires water in which to wallow. Elsewhere, particularly in northern Hopeh, cattle give way to horses. This change is due primarily to differences

in climate and differences in the type of work demanded of the animals (Figs. 19, 20).

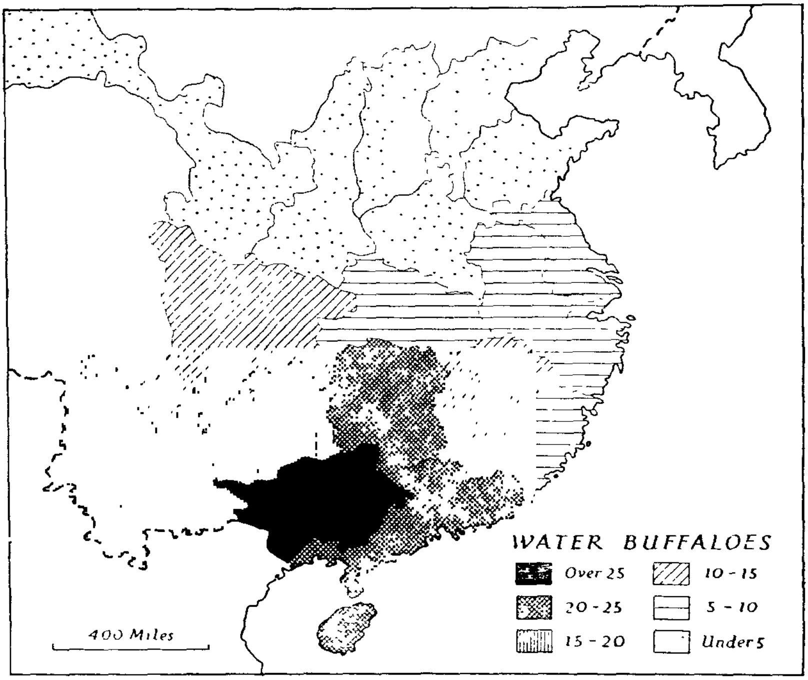

Fig. 20. Distribution of water buffaloes
The water buffalo, which must have water for wallowing, is almost entirely confined to the humid rice region.

Livestock and Poultry on Farms (thousand head) [1]

Kind of Livestock	1934	1935	1936
Water buffaloes	12,172	11,603	11,056
Oxen	21,638	22,647	22,299
Horses	3,874	4,080	3,418
Mules	3,865	4,666	3,913
Donkeys	10,132	10,547	10,041
Goats	22,677	21,933	17,868
Sheep	14,926	20,957	14,025
Pigs	69,028	62,639	63,027
Hens	278,449	246,688	245,148
Ducks	69,337	56,724	56,889
Geese	13,232	10,538	9,058

[1] Excluding Kwangsi.

Source: *Statistical Abstract of China*, 1940, p. 51 (Chungking, 1940).

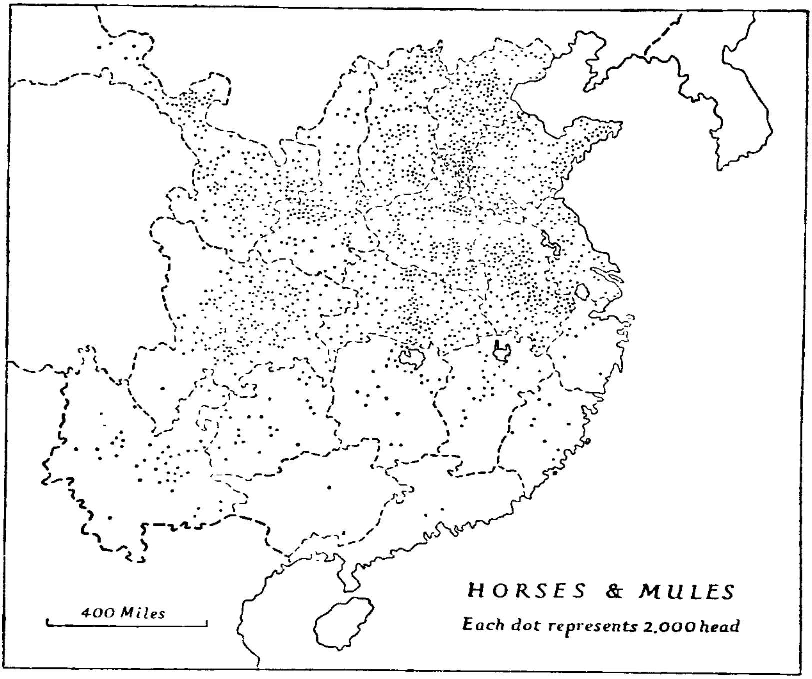

Fig. 21. Distribution of horses and mules
Based on Hermann, A., *Historical and Commercial Atlas of China*, p. 79 (Cambridge, Mass., 1935).

Horses, Mules, and Donkeys

Although horses are found all over China, they are of minor importance in the south (Fig. 21), and even in the north are used chiefly for riding purposes. This is no doubt due to the small type of animals in general use. Szechwan ponies, for example, have grace, speed, endurance, and stamina, but are hardly suited to work in harness. Mules are also used primarily for riding purposes, though in the northern provinces, mule carts with any number from one to four mules inspanned are a common sight. Donkeys are used all over northern China, where they serve many purposes; in addition to being used in the breeding of mules, they are employed as pack animals, carrying everything from coal to foodstuffs, and as draught animals on the farm.

Sheep and Goats

Sheep are not raised in large numbers in China, and at present are abundant only in the semi-arid north-west, in an area between

southern Hopeh and Shantung and in the hilly regions of Chekiang (Fig. 22). Except in Hopeh and Shantung, where the native sheep yield a fine quality wool, the breed is an inferior one, and efforts have been made to improve it by introducing merino sheep from Australia. A cross, almost identical with a merino, has been bred, and the export of wool via Tientsin was becoming more important in the years preceding 1937. The export trade has been subject

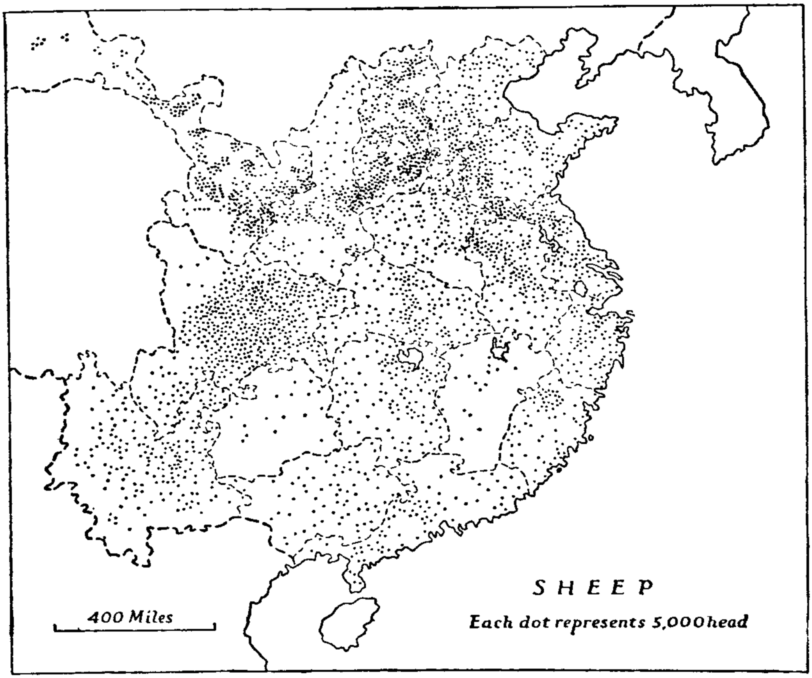

Fig. 22. Distribution of sheep

Based on Hermann, A., *Historical and Commercial Atlas of China*, p. 79 (Cambridge, Mass., 1935).

to wide fluctuations which may be due to the carry-over of part of the year's clip to the following year, or may be attributable to the fact that the production and distribution of the annual clip has been in no way controlled in order to adjust for a constant export. The chief markets for exports in 1936 (valued at $20,000,000) were the United States and Germany. The further development of the pastoral industry in the north-western provinces is deemed desirable in view of the difficulties confronting arable cultivation, and the need for supplementary forms of income. New attempts are being made

to improve the quality and quantity of the wool, and as production increases, the development of the woollen textile industry will be accelerated (Plate 22).

Goats are found in large flocks in the north and west, only where the pasture conditions are poor, where the grasses are scanty or coarse, and the growth of shrubs abundant. Elsewhere they are in small numbers, often mixed with sheep, since the shepherds believe that goats are better leaders of a flock than sheep. The finest mohair comes from the northern parts of Shansi and Shensi.

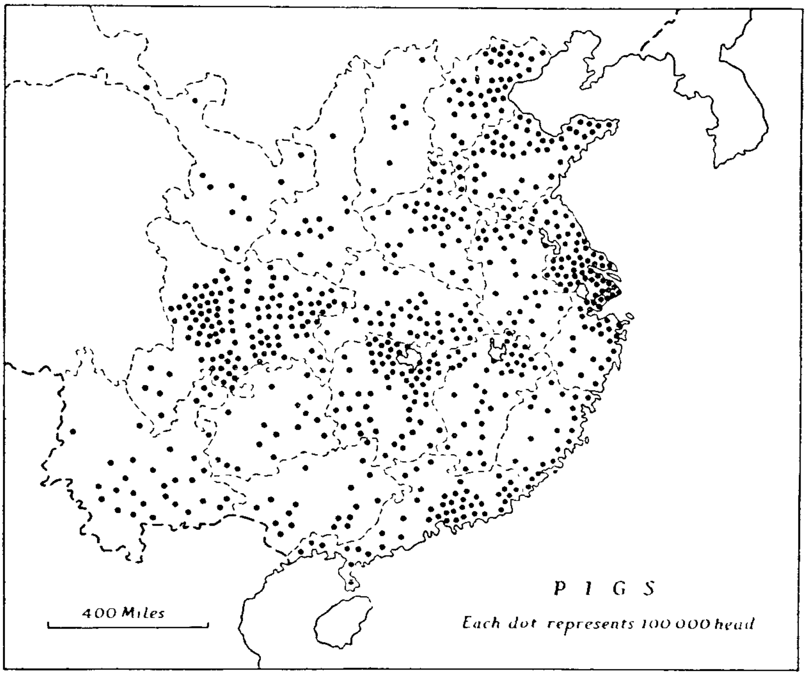

Fig. 23. Distribution of pigs

Based on Shaw, E. B., 'Swine Industry in China,' *Economic Geography*, vol. xiv, p. 385 (Worcester, Mass., 1934).

Pigs

According to recent estimates, China probably has the world's largest swine population. The number of pigs approaches 63,000,000 or approximately one-quarter of the world's total. The densest swine population is found in the alluvial plains of the Hwang ho, the Yangtze kiang, the Si kiang valley, along the coastal plains, and also in the Red Basin of Szechwan. Near large centres like Shanghai,

Canton, and Peiping the production of pigs is much heavier than the average for the whole of the country (Fig. 23).

The method of raising Chinese swine differs markedly from that of the United States and Denmark. Neither dairy by-product feeding nor corn feeding is practised. The pigs are fed on refuse from the table and cultivated fields, which would otherwise go to waste. The manure made available by pig raising is highly valued by the farmers, and fills an important place in the agricultural economy. Pigs also provide the only important meat item on the menu, and the three and a half million people of Shanghai are said to consume one million pigs a year.

The manufacture of pig bristles, both black and white, is also an important industry, in which China dominates world trade. In peace-time she supplies 75 per cent. of the world's commercial supply of bristles, for which the largest demand is in the United States, the United Kingdom, and Germany, where they are used for toilet brushes of all kinds, paint brushes, matting, carpets, felt hats, and as thread in the shoe trade. Most of the bristles come from North and Central China, and the best quality are the white Chungking bristles of Szechwan.

Poultry

Poultry are widely distributed over China. The three most important producing regions are the Canton district, the lower Yangtze valley west of Shanghai, and the Red Basin of Szechwan. Egg products are everywhere an important article of diet, but more and more have been diverted to the export trade since 1918. It is estimated that well over 300,000,000 hens, ducks, and geese are raised annually, and that the annual egg production is about 12,000,000. In 1936 the egg factories were located in Shanghai, Hankow, and Tsingtao, and the export trade was mainly with the United Kingdom, the United States, and Germany. As transport and trade facilities improve trade will probably increase, since the egg products are of good quality.

Land Tenure

This is an aspect of Chinese agriculture which is now receiving great attention. At the present time it is customary to regard an essentially uneconomic land system as the very heart of the problem of rural reconstruction.

Recent investigations show that for China as a whole over 50 per cent. of the farmers are owners (peasant proprietors), less than 33 per cent. are part-owners, and about 17 per cent. are tenants

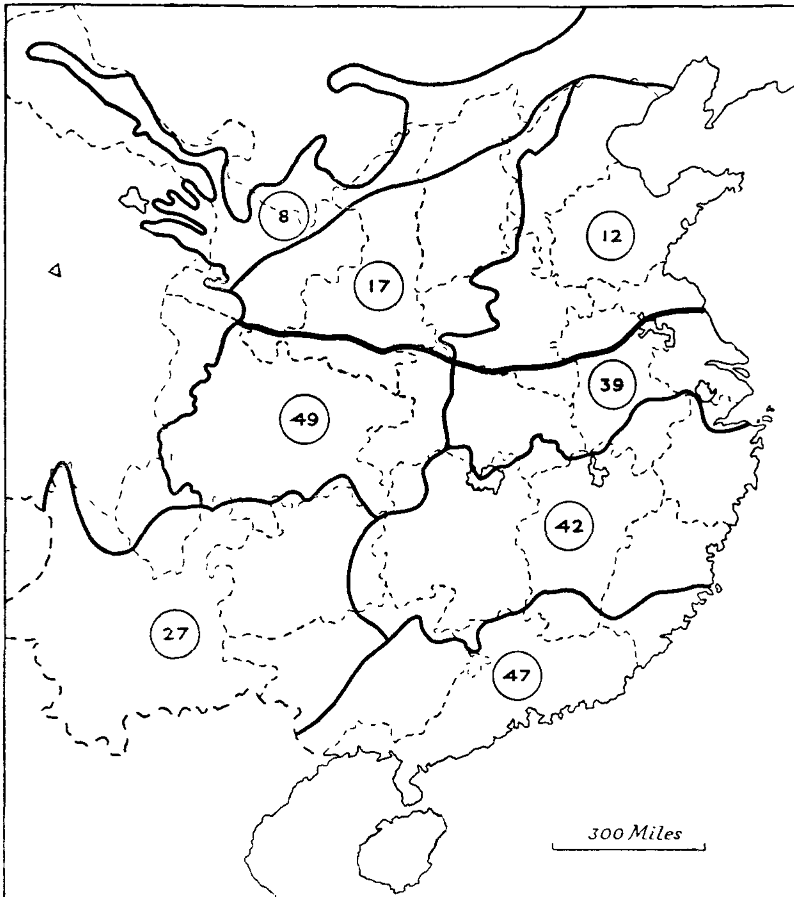

Fig. 24. Percentage of farm land rented

Based on Buck, J. L., *Land Utilization in China : Atlas*, p. 38 (Nanking, 1937). The figures within the circles indicate the percentage of the farm area within each agricultural area (Fig. 6) rented by tenants and by part-owners. Rented land in the rice region as a whole (40 per cent.) is three times as high as it is in the wheat region (13 per cent.), but variations between localities in the same area may be very wide.

only. There is, however, great regional variation, and tenancy is much more prevalent in South China than in North China. It is estimated that about 75 per cent. of the farmers in the northern

wheat region are peasant proprietors, whilst in the southern rice region less than 40 per cent. are owners, 25 per cent. are tenant farmers, and over 35 per cent. are part-owners. There are, however, some areas where all the farmers are owners and others where they are all tenants. Tenancy increases as the Yangtze is approached, and is the rule of Hunan, Kiangsi, Szechwan, and Kwangtung (Fig. 24).

It is possible to explain this distinction. Historically, South China was a semi-colonial area, reclaimed from the wild and settled by the scions of feudal families from the north. Moreover, in the south there has been a larger commercial element, and the exploitation of the rice crop is in the hands of rich merchants. The soil is more productive, there is a greater accumulation of wealth, and land investments have yielded considerable financial benefits to urban capitalists. This goes far to explain the initial attraction of Communism, essentially a movement for agrarian reform, in south-central China where agrarian abuses have been greatest. In contrast the north is economically less favourable, and the commercialization of economic relations has not made much progress.

Evidence collected by Chinese economists in the period 1932–37 pointed to an increase in land concentration, particularly beyond the Great Wall and in the pioneer regions where conditions were fluid. In Suiyuan the Mongolian community lands and the lands of the Mongolian princes were largely controlled by the Chinese administration. Land sales had been monopolized by absentee landowners, normally resident in Peiping. They were said to exact extortionate rents and high interest from impoverished peasants, who were reduced to the status of homeless, agricultural labourers without tools. In Manchuria, also, the incoming Chinese peasants were exploited by war-lords and land-syndicates. The same trend was apparent in the pioneer regions of Yunnan and in the newly drained swamp areas of southern Kiangsu, where the best cotton-growing land had passed into the hands of a powerful landlord class whose sole connection with agriculture was financial. It appears that the increase in land concentration, with its concomitant abuses, was partly a result of the impact of Western commercialism upon a traditional eastern agricultural society. The old customary rights and obligations, which afforded the peasants some degree of security and justice, were tending to give way to modern forms of commercial exploitation.

Plate 13. Grain fields, Shensi

Crops of grain, mainly wheat, outside the city wall of Fengsiang in the Wei ho valley.

Plate 14. Millet field, Shantung

A scene near Taian in the western upland of Shantung; in the background is the granite mass of the Tai shan.

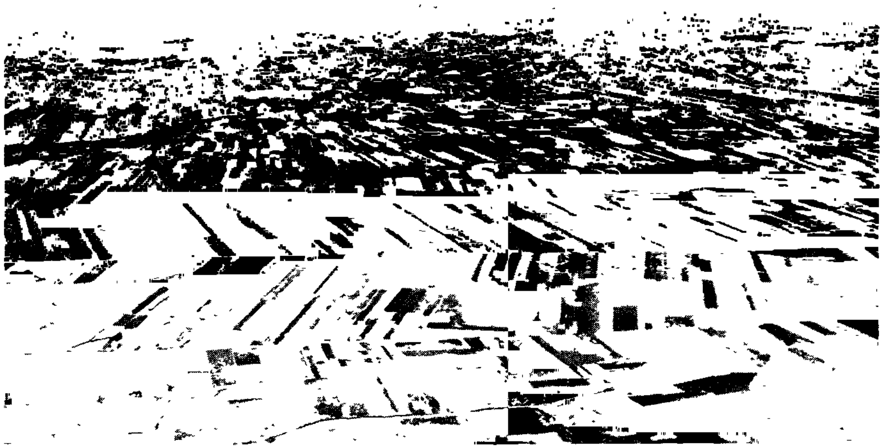

Plate 15. Land utilization, Taiyuan Basin, Shansi

Around Taiyuan, capital of Shansi, is a fertile intensively cultivated basin. This aerial view indicates the closeness of settlement and cultivation.

Plate 16. Agricultural landscape, southern Shansi

A view near Kiangchow in the Fên ho valley.

Minute Holdings and Fragmentation

The mass poverty of China, however, is not caused primarily by agrarian conditions, since rural poverty is widespread in the north where peasant proprietorship is the rule. The primary cause is the pressure of population on the land. This is reflected in the smallness of the holdings which have to support family units often comprising three or more generations. Relatively, the farms are extremely small, the mean size being 3·31 acres as compared with 39·74 in Denmark, 77·3 in England and Wales, and 156·85 in the United States. There is some regional variation. The largest are found in the north-western provinces such as Suiyuan and Chahar, where land is still abundant, and the smallest in the south, where climate, irrigation, and multiple cropping make it possible for the smallest farm to yield a living. All statistics show an agricultural system based on a multitude of small holdings, giving 'the impression of an agriculture of pigmies in a land of giants.'

The small farm in China is further handicapped by its fragmentation. On an average each is divided into from five to six strips. Two-thirds of the farms have an average parcellation of five or less, and one-fifth of six to ten. The parcels are themselves divided up into fields, and there is an average of between eleven and twelve fields per farm. Some 2 per cent. of the farmland is set aside for the ancestral graves, and is not in agricultural use. This parcellation of the land, which is reminiscent of the strip system of feudal Europe, places many obstacles in the way of agricultural progress. Land is used up in needless boundaries and strips between the different parcels, scattered fields are difficult to manage, and the application of modern machinery is impracticable.

Social Aspects

The system which has been briefly described is primarily one of subsistence farming, but recent surveys have shown that to a greater extent than has been commonly supposed the farmer is dependent on cash crops for the purchase of many necessities. The fact that 54 per cent. of all crops grown in a large group of villages surveyed in the North China Plain and lower Yangtze valley were sold for cash points to a relatively commercialized agriculture.

A serious economic defect of the system is the under-employment of labour. Not more than one-third of the able-bodied men are engaged in full-time work. During the sowing and harvesting seasons the demand for labour is heavy, but in the winter it is small,

and in the frost-bound north almost non-existent. To meet this very serious problem of seasonal unemployment attempts have been made in recent years to develop village industries, but at present they are handicapped by inadequate capital and cannot compete with the products of mass production factories. Thus labour in rural China, although industrious, is relatively unproductive. Wages are low but the cost of labour is remarkably high.

This great labour surplus is one aspect of the over-population which is the basic cause of the mass poverty of rural China. Variations of conditions between different parts of the country make it difficult to find a ' poverty ' line for gauging its extent, but it is indicated, as recent investigations have shown, by the very high percentage of family budgets allotted to primary necessities of food, clothing, and shelter. In normal times for China as a whole, although not everywhere, the minimum requirements of food energy seem to be met, but there is little margin for education or recreation or as a reserve against bad years. For lack of it crop failure through flood or drought means widespread famine, and a large proportion of the rural population lives on the brink of destitution. Resistance to disease or to troubled social conditions is proportionately weakened. In general, too, peasant clothing is inadequate, consisting mainly of cheap cotton garments, and the houses are small and often insanitary.

The political and social disturbances of the war-lord period before the Nanking government obtained control over the situation undoubtedly aggravated this chronic poverty. For years the peasants in many parts of China were at the mercy of local tyrants, and subjected to extortionate taxation and requisitions to finance wars in which they had no interest.

If agrarian China is over-manned it is also under-capitalized. The farmer's most pressing requirement is credit at reasonable rates of interest. Agriculture under the best conditions is an industry of slow turnover, and where incomes are so small and margins so narrow as they are in rural China, the peasant must find some means of tiding over the interval between sowing and harvesting. As it is he is often left on the verge of ruin by the time the last year's grain crop has been used up, and is usually burdened with debt. He easily falls into the clutches of the powerful money-lending class, which is recruited from all classes of society, officials, gentry, and richer peasants as well as merchants and bankers. Loans may be obtained from his landlord, from the dealer to whom he sells his crops, or from the pawnshop. Rates of interest vary from 25 per

cent., which is considered moderate, to a normal 30-40 per cent., and even as high as 150–200 per cent. Crops are pawned in summer, farm implements in winter, and household belongings at all seasons. Investigations of the Chungking branch of the Bank of China in 1934 showed that 40 per cent. of the total population of Chungking and its suburbs were in debt, but the percentage increased away from the river ports. In the district of Kwangnan, north of Chungking, it reached in 1936 70 per cent. of a total population of 144,000. Interest rates, both urban and rural, were found to have risen rapidly and with them the number of usurers.

The urgency of the problem of providing rural credit has long been recognized. As far back as 1915 the government passed a measure for the creation of agricultural banks, and several were established in the provinces. But the real solution undoubtedly lies in building up a system of rural co-operative credit societies. In recent years much voluntary work with this end in view has been done in many parts of China, and it is now actively supported by the National Government.

The picture here given summarizes the conditions which existed in agrarian China before the Kuomintang became firmly established. In the few years, 1930–37, important developments occurred as a result of the policy of the Nanking government. Of these a brief account will now be given.

Agricultural Reconstruction, 1930–37

The period following the war of 1914–18 was marked by a world-wide development of the planned economy. This tendency could be discerned in China, where the principle of state economic planning came to underlie the various aspects of the reconstruction movement during the period.

As has been already indicated (see p. 44), the Government's policy was complicated by its struggle with the Communists. While the Kuomintang leaders considered that military and political unification should precede economic reform, the Communists believed in the necessity of alleviating the mass poverty of the peasantry at the earliest opportunity. They were able to put their policy into operation in Kiangsi, where they divided up the land, developed the co-operative movement, and set up a society of small yeoman farmers. Chinese Communism was largely a movement for agrarian reform, and it is significant that when the Nationalists conquered Kiangsi

in 1934 they found it advisable to leave the land settlement unchanged in many areas.

Within the ranks of the Kuomintang there were also substantial differences between the military elements who believed that the army was the first charge upon the national budget, and the left-wing members who considered that the surest foundations for a national revival lay in improving the lot of the peasantry. From time to time the clash between the two groups was much in evidence, though after 1933 there was an increasing recognition of the overwhelming importance of agrarian reform.

Governmental policy was first indicated when the Rehabilitation Committee was set up in 1933 to carry out research and to co-ordinate the work of the various agricultural organizations throughout the country. There was also considerable collaboration with the League of Nations, and many technical experts visited China. Among them was Sir John Hope Simpson, who was appointed Director-General of the National Flood Relief Commission. These were steps of great significance ; for the first time the agrarian situation was being studied with an adequate knowledge of the facts.

There now follows a brief outline of some of the more outstanding achievements in the main fields of agricultural reconstruction.

Irrigation and Water-control

This was one of the negative aspects of reconstruction, and aimed at the prevention of recurrent floods and drought through the construction of irrigation canals and dykes and the carrying out of dredging operations and reafforestation. The National Government was handicapped by lack of funds, since large amounts of capital are required to carry out such projects.

The early development of water control was largely due to the enterprise of the China International Famine Relief Commission, and after 1930 there was close co-operation between this body and the National Economic Council.[1] Important canals constructed before 1937 included the Sato-Mincheng canal in Suiyuan province, the Weipei or Kunghui and the Lohui canals in Shensi province, and the Yungting canal in Ninghsia province, all in the dry north-west. In other parts of China irrigation works were on a small

[1] The National Economic Council was set up in 1931, but did not formally function until 1933, and was designed to co-ordinate the work of the various ministries engaged on reconstruction. It had the power to approve and supervise projects of economic development, and if necessary could itself undertake special projects.

scale, and were sometimes promoted as experimental projects rather than for famine prevention (e.g. the Ch'uisinku Model Irrigation Farm established by the North China River Commission on the bank of the Kiyun river, 1933).

The most important flood prevention work (dredging and construction of levées and sea-walls) was done by the National Flood Relief Commission. In addition to carrying out considerable dredging activities in northern Kiangsu, it repaired nearly 2,500 miles of levées along the Yangtze and its tributaries (particularly the Hwai, Kan, Han, Ying, Sha, Yilo). In Kiangsu and Chekiang many rivers were dredged, and sea-walls were constructed to protect the lives and properties of inhabitants living along the foreshore. Reafforestation was also given a prominent place in the programme, but the complete absence of woodland due to disafforestation made it difficult to achieve any substantial progress.

Technical Improvements

These embraced crop improvement, the revival of sericulture, the promotion of animal husbandry, and the encouragement of agricultural education. The work was carried out by the National Agricultural Research Bureau, which contained departments of crop production, animal production, and agricultural economics.

The greatest efforts were made in the field of crop-breeding, since it was considered that, given the existing level of education, improved seeds would yield a greater return per unit of land than any change in methods of cultivation or soil treatments. By 1936 there were in China 121 stations carrying on crop-breeding work distributed over the eighteen provinces with the greatest concentrations in Kiangsu (27), Hopeh (12), and Shantung (11).

Some attention was paid to the development of animal husbandry, particularly in pioneer and wasted lands which were insufficiently fertilized, and an effort was made to prevent animal disease, and to improve the quality and yields by scientific breeding. In 1937, however, the number of trained veterinary experts was insufficient to meet requirements, and the attempts to improve the quality of the livestock showed few positive results.

Land Tenure

The importance of land reform was repeatedly emphasized in the early years of the Kuomintang, and Dr Sun Yat-sen declared that

'each tiller of the soil shall possess his own fields.' Since then Generalissimo Chiang K'ai-shek has stated that the equalization of land ownership is the policy of the Government, and that the ultimate objective is to make China into a nation of small owner-farmers. Although several measures were enacted, it was not until 1937 that new principles were enunciated which were to govern a revision of the existing land law. It was then laid down that a minimum area of land for each owner-cultivator should be determined; that under certain conditions a peasant could apply for the requisition of the land which he farmed; and that the maximum rent should be fixed at 8 per cent. of the value of the land. According to reliable observers there were strong forces at work trying hard to frustrate the Government's intentions, and it was feared that landlords would establish all sorts of fictitious land values and nullify any advantage which might accrue to the peasants.

Taxation

The two groups within the Kuomintang came definitely into conflict over the question of taxation. The civilian group wished to relieve the peasants from excessive tax burdens as much as possible, but the military group was largely dependent on taxation to meet its heavy expenditure. The reform of the taxation system was made difficult by the high rate of military expenditure, and the position was worsened by the general decline in government revenue due to wholesale smuggling through the Japanese-controlled parts of North China.

A fairer redistribution of the land tax burden could be effected only through the substitution of the system of land taxation based on the settlement of 1913 by a system of land value taxation preceded by a modern cadastral survey. The task is enormous, but in the few areas where the cadastral survey was carried out there was an increase in the amount of tax collected.

Further steps in the direction of relieving the burden of taxation and surcharges were taken at the Second National Financial Conference in 1934. It was laid down that land surtaxes should not exceed the basic land tax, that the levying of local surcharges should be prohibited, and that as from 1936 provincial or *hsien* governments should not be allowed to increase the existing surtax on land under any circumstances. These measures were never fully carried out and gave no real relief to the peasantry. The land tax remained

a problem of the first order, its incidence often arbitrary and oppressive, and its solution dependent upon fundamental changes in the whole agrarian situation.

In July 1941 the National Government took over the collection of the land tax from the provincial governments and instituted the collection of this tax in kind. Payment of the tax was generally in rice but also in wheat, kaoliang, barley, and cotton, according to the chief crops of the different areas. By this measure it was hoped to reduce the amount of money in circulation and thus the danger of inflation. The compulsory purchase of grain to feed the army and civil servants has also been introduced; available surpluses are then sold to the public.

The Co-operative Movement

Perhaps the most outstanding aspect of rural economic reconstruction prior to 1937 was the development of a system of co-operative societies. Simple forms of co-operation such as mutual benefit societies had long existed among the peasants. The rapid expansion of the co-operative societies movement before the Sino-Japanese war was not, however, a spontaneous growth from the masses below, but represented a policy of promotion from above, mainly by governmental agencies. Co-operation ranked very high in the Kuomintang's programme, and was considered to be the most effective way of eliminating village usury and thereby making possible an increase in agricultural production.

Up to 1927 the movement was primarily social and philanthropic in aim, and was first sponsored by the China International Famine Relief Commission. This body took steps to introduce rural credit co-operatives in Hopeh in 1923 as a preventive measure against the recurrent famines of the northern China area. Societies were organized by the farmers themselves, who received help only when the Commission was satisfied that certain recognized standards of book-keeping and efficiency had been established. The loans were mainly of the 'credit' type, and the farmers were encouraged to manage them without supervision. By 1934 approximately 470 societies in receipt of loan money were recognized by the Commission and slightly over 600 were unrecognized. The invaluable experience acquired by the Commission was an important factor in the rapid extension of the movement under the Kuomintang.

Positive measures were not taken until some time after the National Government came into power, but the floods of 1931–32 gave the

required stimulus. The first step was the establishment of the so-called 'mutual aid' or 'preparatory' societies in the provinces seriously affected by the disaster, namely Kiangsi, Hunan, Hupeh, and Anhwei. The China International Famine Relief Commission was instructed to distribute relief loans to 'mutual aid' groups, each of which consisted of a few farmers who gave a joint guarantee to repay the whole sum. It was hoped that the idea of a co-operative credit society would appeal to the farmers, and that the groups would be transformed into societies proper after about a year's trial. This method was successful, and was later applied to the recovered Communist area in 1932, to Hopeh and Chahar after the Manchurian conflict, and to the Hwang ho flood area in 1934. As a result the number of societies showed a very rapid increase from 584 in 1927 to 14,679 in 1934, and 26,364 in 1935, with a total membership of over 1,000,000 in that year. There were estimated to be approximately 37,000 co-operative societies in operation at the end of 1936. Detailed figures for 1933 and 1935 are shown in the first table on page 53.

The rapid increase after 1934 was in part due to the activities of the big banks, who began to display an interest in this form of rural investment about that time. Flood, famine, and civil war had resulted in a considerable flow of funds from the villages to the big cities, and several of the banks sought to serve their own and the national interest by finding new outlets for investment in rural areas. They set about their task with enthusiasm, sending out their own representatives, organizing societies for credit or marketing, and opening warehouses for the deposit of agricultural goods.

In 1935 over 90 per cent. of the societies were to be found in the following ten provinces, ranking in order of importance according to total membership—Kiangsu, Hopeh, Kiangsi, Shantung, Honan, Anhwei, Chekiang, Shensi, Hupeh, and Hunan. The societies in Hopeh were the oldest in existence, those in Kiangsu and Chekiang developed immediately after 1928, those in Anhwei, Kiangsi, Hunan, and Hupeh after the flood of 1931–32, those in Shantung and Honan during the 1934 flood, and those in Shensi were developed mainly for the co-operative marketing of cotton. As in India and Japan, the societies were primarily for credit purposes, but the co-operative principle was being applied more and more to other uses, as is shown by the figures for 1935 in the second table on page 53.

Co-operative Societies, 1933 and 1935

Province or Municipality	1933	1935	Membership, 1935
Kiangsu	2,220	4,077	138,369
Hopeh	1,460	6,240	135,725
Kiangsi	961	2,038	131,447
Shantung	539	3,637	106,143
Honan	55	1,761	100,324
Anhwei	2,445	2,284	73,673
Chekiang	1,282	1,972	70,666
Shensi	32	671	63,690
Hupeh	375	1,228	60,122
Hunan	249	963	56,486
Kwangtung	47	307	23,315
Fukien	5	312	11,678
Shansi	20	453	6,692
Kweichow	4	4	3,845
Yunnan	27	27	2,908
Kansu	3	33	2,906
Suiyuan	60	54	1,115
Chahar	3	3	749
Szechwan	10	10	665
Kwangsi	12	14	592
Tsinghai	1	1	19
Shanghai	31	123	17,197
Tsingtao	15	15	11,481
Hankow	76	76	5,072
Canton	3	3	4,800
Nanking	6	50	3,236
Peiping	7	7	1,028
Tientsin	1	1	120
Total	9,869	26,364	1,034,061

Source: Chang Yuan-shang, 'The Co-operative Movement,' *Chinese Year Book* 1936–1937, pp. 1277, 1281–82 (Shanghai, 1936).

Functional Distribution of Co-operative Societies in China, 1935

Function	Societies	Per cent.	Members	Per cent.
Credit	15,429	58·8	426,004	42·4
Marketing	2,293	8·7	117,587	11·7
Purchase	738	2·8	67,243	6·7
Utility	1,069	4·1	74,422	7·4
Production	2,321	8·9	106,510	10·6
Multiple Purpose	4,327	16·7	212,636	21·6
Total	26,177	100·0	1,004,402	100·0

Source: Fong, H. D., *Towards Economic Control in China*, p. 65 (Tientsin, 1936).

Credit societies were particularly numerous in Hopeh and Anhwei, and although their proportion to the total number of co-operative societies in all the provinces was declining, the absolute number was increasing.

The movement had thus undergone a considerable expansion, but as was inevitable in a large country like China, a certain amount of duplication and lack of co-ordination resulted. An attempt was made to overcome this weakness with the passage of the Chinese Co-operative Societies Act, 1934. This set up a Co-operative Department under the supervision of the former secretary-general of the China International Famine Relief Commission. Later a Bureau of Co-operatives was established within the Ministry of Industry, and in 1935 the Co-operative Commission of the National Economic Council was formed to act as the promoting, financing, co-ordinating, and advisory body of the whole movement.

Experienced co-operative workers, who were in China during this period, believed that the movement was running several risks, particularly the possibility of domination by the banks and inability to break the stranglehold of usurers upon the peasants. The banks, they considered, were tending to use the credit co-operatives as 'middlemen' between themselves and the farmers. The organizers were usually unqualified, and were often landlords or well-to-do peasants who loaned out money obtained from the financing agencies to extort usurious rates of interest. There was, indeed an urgent need for the training of a staff properly qualified in co-operative methods. The quality of the personnel was uncertain, and auditing, the most important factor in co-operative development, was frequently unfamiliar to organizers as well as to the directors and members of societies. Post-graduate training in co-operative practice had been established in an attempt to remedy this deficiency.

In spite of these criticisms the co-operative movement was making real progress during these years, and was seen to provide the most promising way of supplying agrarian China with the capital she so urgently desires. If the dangers indicated above can be overcome, if sufficient safeguards can be erected such as to ensure the effective and disinterested guidance of the movement, then there is a great future for co-operation in the country.

Finally, it is necessary to stress that there are certain elements in Chinese national life which are conducive to the growth of a strong, vital movement. There is the great enthusiasm and confidence among the *intelligentsia*, and there is the general faith of the public

Plate 17. Aerial view of countryside near Nanking

The valley floors and terraced lower hill slopes are intensively cultivated, while the hill tops remain wooded.

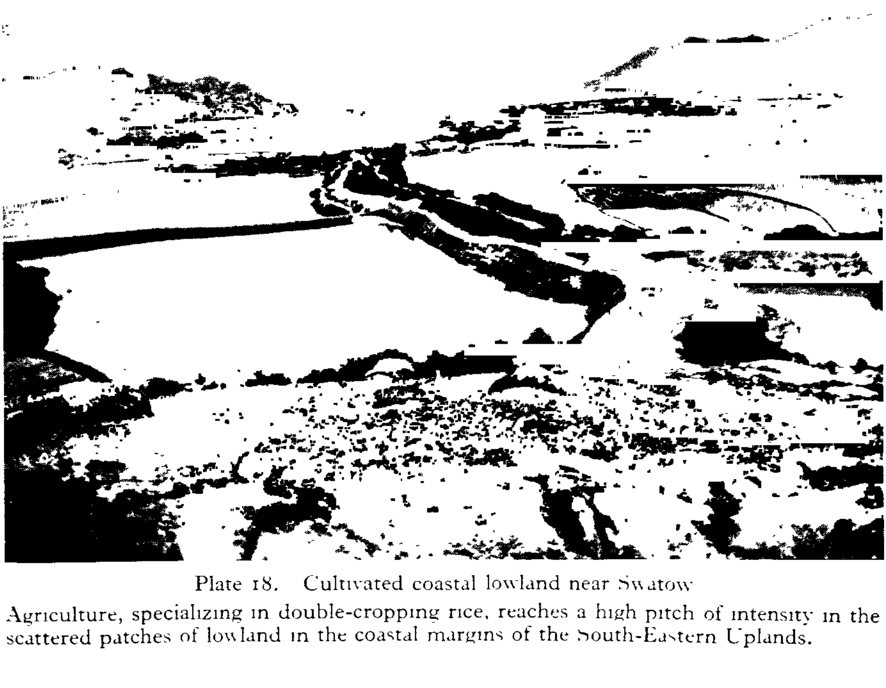

Plate 18. Cultivated coastal lowland near Swatow

Agriculture, specializing in double-cropping rice, reaches a high pitch of intensity in the scattered patches of lowland in the coastal margins of the South-Eastern Uplands.

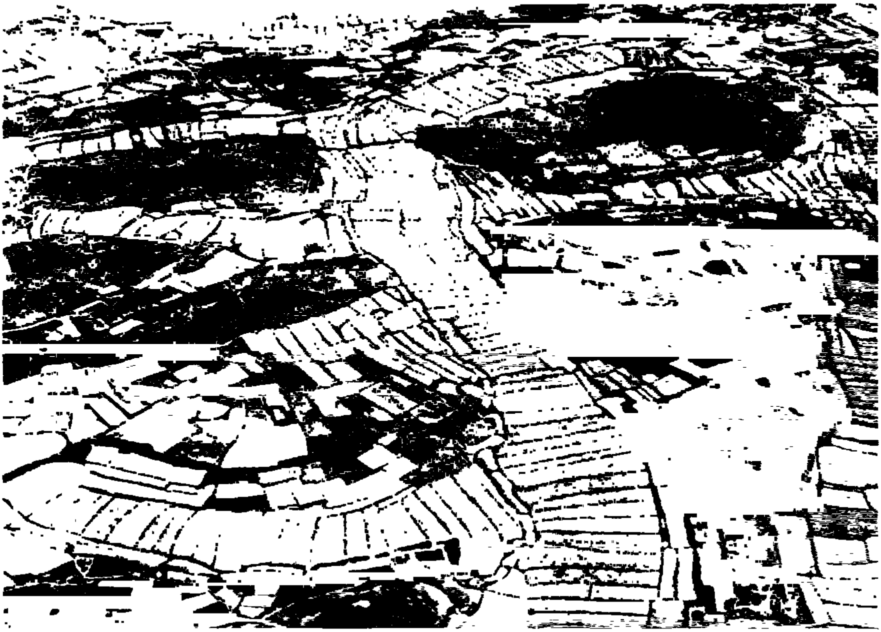

Plate 19. Land utilization, northern Kwangtung
Intensively cultivated lowlands among disafforested hills north of Canton.

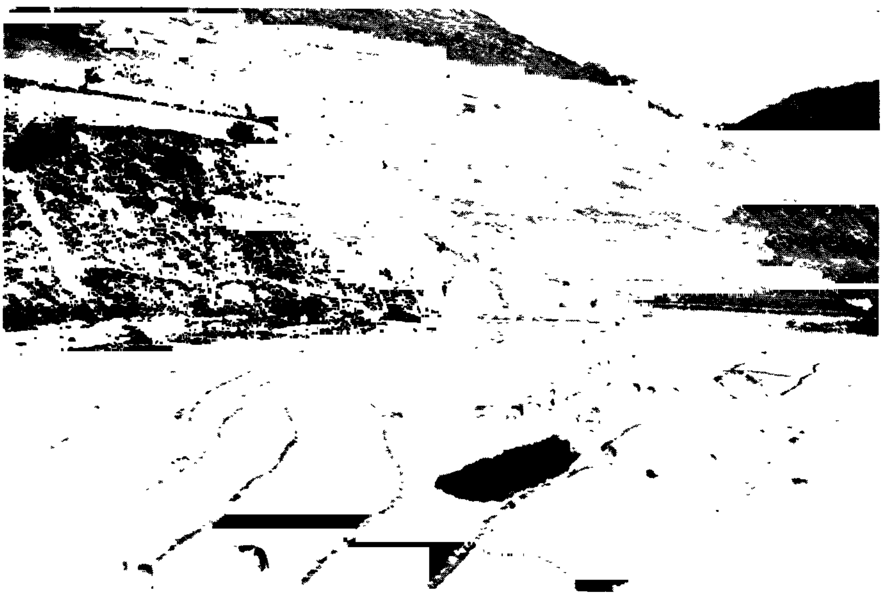

Plate 20. Ricefields, Yunnan
In mountainous Yunnan, cultivation of necessity is confined to valley floors. There are some indications of terracing on the lower slopes of the hillside, largely denuded of its forest cover at higher levels.

in co-operation. Above all, the Chinese farmers themselves are one of the greatest sources of strength. Their honesty and common sense enable them to handle a sum of money with little prior training or subsequent guidance in its management. Misappropriation has been infrequent, and failures have usually been due to interference from above or inadequate teaching of co-operative principles and methods. Their community spirit is also a very favourable factor, and here may be quoted the testimony of an authority with an unrivalled experience of rural co-operatives in different parts of the world.

> Still rarer and more precious than honesty or sound sense is the community spirit. The village spirit in China is not only the family or clan (which may include one hundred houses or more) ; the two groups become identical. The same understanding of a common village interest, the same capacity to compromise and work together for a common end, will be found in villages which contain several families and clans ; not, of course, everywhere ; but often enough to create an entirely different foundation for a co-operative structure from that of countries in which the community spirit has been obliterated by laws and strong administration or at least lingers only in the sphere of caste or domestic business. . . .
>
> Thanks to this sense of communal unity, the Chinese farmer behaves fairly towards his co-operative societies, and gives them, as a rule, his loyal support, even when their plans are ill-advised, their proceedings unscientific and their economic results very dubious.[1]

The future of co-operation in China is bright, and indeed since the outbreak of war with Japan there have been remarkable developments of which some account will be given in a succeeding chapter (see pp. 152–8).

War-time Developments, 1937–44

Since the outbreak of the Sino-Japanese war the need for agricultural improvement has become more urgent. Some of the richest lands in the coastal regions have been occupied by the enemy, and the Chinese have been forced to withdraw into the more rugged and less fertile interior. As further retreat becomes necessary—this was especially so during the early stage of the war—the area of ' Free China ' has continued to diminish, while at the same time the population has been swollen by the flood of refugees from the eastern provinces. The war-time needs for feeding this population, for the supply of raw materials for industry, and for the maintenance of the export trade, have, therefore, called increasingly for greater agricultural production. The results achieved in these directions,

[1] Strickland, C. F., *The Co-operative Movement in China*, pp. 22–23 (Nanking, 1935).

although less spectacular than in transport and industry, are nevertheless impressive, though there are indications that the general situation has deteriorated since 1943.

Although by no means all of the so-called 'occupied' territories of China are under effective Japanese control, war-time reconstruction has been largely confined to the ten provinces of the north-west and south-west which were considered relatively safe from enemy attack. It is estimated that the provinces concerned—namely, Szechwan, Sikang, Yunnan, Kweichow, Kwangsi, Shensi, Ninghsia, Kansu, Tsinghai, and Sinkiang—occupy an area slightly larger than the United States, excluding Alaska and other outlying territories, and have a population of more than 100,000,000 (see vol. ii, p. 247).

In most food crops, including rice, the ten provinces enjoy a surplus, but there is a serious shortage of wheat because the most productive areas have been occupied by the enemy or lie in the territory of guerilla operations. Shensi, in particular, suffers from the shortage of grain, and the province has experienced frequent famines. The surplus of rice is due to the large production of Szechwan, which is now China's largest grain-growing area.

With the exception of cotton, these provinces are well endowed with raw materials for industry. Among those commodities already produced in substantial quantities and capable of further expansion are tung-oil, tea, pig bristles, wool, hides and skins, vegetable oils, peanuts, tobacco, and sugar. In many of these provinces, especially Sikang, Tsinghai, Ninghsia, and western Szechwan, there are rich forest resources sufficient for the development of a substantial paper and pulp industry. The deficiency in cotton, however, provides a serious problem for the newly established cotton mills in Szechwan since Shensi is the only important producing area under the control of the National Government, and the cost of transporting its cotton to Chungking is very high.

The basic solution to the problem of food and agricultural raw materials for industry is to increase production. Of the measures so far carried out the most important are the erection of irrigation works, the reclamation of new land, the extension of crop area, the substitution of cereal for opium crops, improvement in agricultural technique, and the development of the co-operative movement and other forms of rural finance. This work is in the hands of a number of government agencies. The National Agricultural Research Bureau of the Ministry of Agriculture and Forestry, together with

the provincial agricultural institutes, is responsible for agricultural improvements in its technical and scientific aspects, while the Agricultural Production Promotion Committee of the Executive Yuan is in charge of extension work. Financial assistance is provided by the Agricultural Credit Administration (Ministry of Economics), and by the Joint Board of the Four Government Banks, which maintains a network of co-operative banks in most of the provinces. The Ministry of Food, established in 1941, has also made great efforts to increase food production through the establishment of granaries, especially in Szechwan.

Irrigation and Water-control

The character of Chinese agriculture is such that irrigation and its counterpart, flood-control, are considered to be the most important means of increasing agricultural production. It is not surprising that, despite the war, the Government has continued its work on irrigation schemes, and is making plans for their further expansion extending to an area of nearly 400,000 acres. Since 1937 much attention has been paid to the north-west where the Huanghui and Puchi canals (Kansu) irrigating 10,000 acres, and the Lohui, and Heihui canals (Shensi) irrigating 116,000 acres, have been completed. There are a number of other projects under construction and survey. In the south-west plans are in progress for the irrigation of 60,000 acres in Szechwan, 1,800 in Kweichow, 20,000 in Hunan, 60,000 in Kwangsi, and 100,000 in Yunnan. River conservancy commissions, notably of the Yellow river, the Yangtze kiang, and the Hwai ho, have been called upon to carry out the work of surveying, planning, and actual construction. It is considered that the completion of these irrigation projects will contribute to the solution of the food problem perhaps more than any other single improvement.

Land Reclamation and Settlement of Refugees

For the dual purpose of increasing production and solving the problem of refugees from the occupied zones the Government has encouraged land reclamation and settlement. The Ministry of Agriculture and Forestry, through the Land Reclamation Bureau, controls ten national reclamation areas in 'Free China.' The most important one is in Shensi, where it is estimated that the Huangking shan area, consisting of nearly 100,000 acres of good land in the east-central part of the province, north of Wei ho, can support about

50,000 people. By the summer of 1942 approximately 29,500 colonists had already settled there, and plans for receiving refugees from the Hwang ho flood regions were under consideration. Within the same province the Liping area in the lower Han valley, on the border of Szechwan, and the Yen shan districts on the north bank of the upper Wei ho, have a reclamation area of over 98,000 acres able to accommodate 68,000 settlers. In Kansu two reclamation zones covering 30,000 acres have been marked off, one in the south-western and the other in the north-western part of the province. In some of the areas where settlement is under way the Ministry of Agriculture is introducing the system of collective farms, but much effort has yet to be made in propaganda and education to make the farmers realize its advantages.

Reclamation projects are being organized in the other provinces of ' Free China.' In northern Szechwan the settlement area, covering the rich and fertile districts of Pingwu and Peichwan, is capable of supporting 30,000 people. Large areas have also been set aside in Yunnan, but formidable obstacles have been presented by the prevalence of malaria and by transport and communication problems. As for Kwangsi, half its cultivable land is not yet under cultivation, and the possibilities for reclamation are reported to be great. Preparations are also under way for post-war reclamation work in interior provinces. It is planned to settle 1,500,000 soldiers and their families on 3,000,000 acres of land in Kansu, Tsinghai, Ninghsia, and Suiyuan in the north-west, and Szechwan, Sikang, and Yunnan in the south-west.

Extension of the Crop Area

Production has been further increased by extending the area under winter cultivation. With the exception of the north-west and certain frontier territories the natural conditions in ' Free China ' are well suited to the system of double-cropping, that is, the planting of rice or other summer cereals in summer and the planting of wheat or beans in winter on the same land. Yet before 1938 only three-quarters of the total summer crop area was under winter cultivation, while more than half the total area was fallow in the winter season. Although there are difficulties in respect of irrigation and drainage, much of this land is adapted to double-cropping, and a movement for winter cultivation was, therefore, initiated in 1938. The outcome of this policy can be seen from the following statistics:

Area under Winter Cultivation in 'Free China' (acres) [1]

1931-37 (average)	1938	1939	1940	1941
44,309	44,408	45,484	47,457	49,369

Source: Chinese Ministry of Information, *China after Five Years of War*, p. 146 (London, 1943).

Suppression of Opium Culture

New lands have been made available for cultivation through the reduction of the acreage devoted to non-food products. Limitation has, for instance, been imposed upon the area of tobacco fields in Honan, but the most significant of restriction measures has been the attempt to suppress opium culture. According to a study made by the Anti-Opium Society in 1938, if all the land growing opium were converted into grain fields, China's grain production could increase by an amount roughly equal to the quantity imported annually before the war. In 1935 the Government adopted a programme of gradual suppression of opium culture over a six-year period (1935-40), and this was vigorously pushed forward under the personal supervision of Generalissimo Chiang K'ai-shek. In 1938 the increase in the production of grain crops was attributed largely to the sharp curtailment of opium cultivation which in Szechwan, Yunnan, and Kweichow had dropped 60 per cent. in comparison with the previous year. In Kweichow the Government plans to prohibit entirely the cultivation of opium and to substitute wheat and plants producing vegetable oil. It is reasonable to expect that this tendency to restrict and eventually to abolish opium production will continue at an accelerated rate.

Technical Improvements

In the technical sphere the Government has made great efforts to help the peasants to improve their agricultural technique by the selection of seeds, the use of fertilizers, and the prevention of plant diseases. Before the war most of these activities were carried on in the lower Yangtze provinces, but since 1937 attention has been focused on the west. In 1938 the Agricultural Research Bureau

[1] This table refers to Szechwan, Yunnan, Kweichow, Hunan, Kiangsi, Fukien, Kwangtung, Kwangsi, Ninghsia, Tsinghai, Shensi, Kansu provinces and parts of Honan, Hupeh, and Chekiang provinces.

was transferred to Chungking, with the five main stations (staffed by 200 graduates of agricultural colleges in China and abroad) located in the provinces of Szechwan, Kweichow, Hunan, Kwangsi, and Yunnan. Closely connected with agricultural extension work is the opening of model farms by the Ministry of Agriculture and Forestry. In October 1942 there were four national farms located respectively at Ichang (Hunan), Opien (Szechwan), Pingha (Kweichow), and Yingtak (Kwangtung). The development of agricultural technique in the north-west and south-west has been greatly stimulated by the concentration in these regions of the best technical personnel from the whole nation.

Cereals (see pp. 17–24). In order to promote food production the Government has been active in the extension of superior varieties of rice and other grains, and in inducing farmers to plant wheat and cereals in place of tobacco, cotton, rape, and the opium poppy. Most of the extension work on rice culture has been in Hunan, which is one of the most important producing provinces under the control of the National Government at the present time. Improved seeds have had an average yield 10 to 25 per cent. greater than that of local seed. A further increase in rice production has been made possible by reducing the acreage of glutinous rice, which is mostly used for wine-making.

Improved varieties of wheat have been planted in many districts, and have produced larger yields than those in general use. A species of wheat, selected after a long period of experimentation in Honan, is now being introduced into Yunnan, where it is taking up the acreage formerly devoted to opium; and into Shensi, where the authorities are trying to encourage the production of wheat instead of cotton in order to solve the province's cotton problem and to ease its food shortage.

Cotton (see pp. 28–31). The loss of most of the spinning and weaving factories in the war area and the difficulty of moving the raw cotton from the place where it is grown to where it is needed, have necessitated the limitation of the acreage of the plantations, especially in Honan and Shensi. On the other hand, a number of cotton centres are developing in the interior, creating a demand for cotton which local suppliers cannot satisfy, and which is not covered by the small amounts which are now finding their way up the Yangtze valley. To meet this abnormal situation, the Government is trying to stimulate production in Szechwan, Yunnan, and Kweichow. Large amounts of improved seeds have been distributed in Szechwan, where the

acreage under cotton has increased considerably since 1937. In Yunnan, Egyptian cotton has gained a successful foothold during recent years. Its fibres, which are $1\frac{1}{4}$ to $1\frac{1}{2}$ in. in length, are thin and strong and possess a fine lustre. This particular variety is under careful study, and it is likely that its cultivation will be greatly extended.

Silk (see p. 32). The work of silk culture improvement was interrupted in 1937, when attention had to be transferred from Chekiang and Kiangsu to centres of silk production in the interior. Improved silkworm eggs were brought from the eastern provinces and were distributed among the farmers. Since then financial help has been granted in the silk-producing areas of Szechwan for the purpose of encouraging egg-production and mulberry planting. Two large mulberry nurseries have been established in Nantsung and Peipei, each capable of producing one or two million yearlings per annum. A South China Silk Improvement Station, organized in Kwangtung by the Ministry of Economic Affairs, is disseminating scientific knowledge in silkworm-rearing, cocoon-drying, and silk-reeling. In Yunnan the National Government is co-operating with the provincial department of reconstruction. The climate in Yunnan and in parts of Kweichow is suitable for silkworm-rearing, and, given proper encouragement, these two provinces should be able to make important contributions to the silk industries of Free China.

Tea (see pp. 33–4). The China National Tea Corporation has continued to promote and improve tea cultivation. It is now operating the Keemen Tea Factory in Anhwei, the Hsiushui Tea Experimental Station in Kiangsi, and the Enshih Tea Experimental Station in Hupeh. It is gradually extending its influence to the south-western provinces, and in Yunnan experimental factories have been set up at Fohai and Shunning. These experimental stations which are spreading knowledge and use of scientific equipment, selection, and cultivation among planters, will, it is hoped, lay the foundations for a revival of China's tea export trade.

Tung-oil (see pp. 34–5). The importance of this product increased steadily in recent years. This is largely due to the enterprise of the China's Vegetable Oil Corporation, which is under the supervision of the Ministry of Economic Affairs. Its principal work is the improvement and standardization of the quality of vegetable oils and the promotion of scientific research.

The potential demand for China's wood-oil is great, but exports have fallen to insignificant levels, following the cutting of the vital

trade routes with the outside world. At the present time it is being used as a material for the production of gasoline and rubber, which were formerly imported.

Disease and Insect Control. This work is being carried on by the National Agricultural Research Bureau. Special investigation is being made of the nature and kinds of diseases which are found in the interior provinces. A number of *hsien* in Szechwan have been set aside as demonstration centres for plant disease and insect control.

Soil and Fertilizer Improvement. Owing to transport difficulties it is now impossible to import large quantities of chemical fertilizer from abroad, and domestic production is as yet unable to supply market demands. In order to overcome this difficulty the Government has stressed the importance of barn manure and of growing more legumes. The Ministry of Economic Affairs is planning to establish several bone-meal factories and large-scale chemical fertilizer manufacturing plants in Szechwan and Hunan. Soil studies and field tests of fertilizer are being made in the south-western provinces by experts, and a plan for the improvement of soil and fertilizer in these regions will be formulated when the studies are concluded.

Land Tenure

Further steps have been taken to realize Dr Sun Yat-sen's policy of the equalization of land ownership. The National Land Administration was established by the Government in June 1942, to safeguard the rights of tenant farmers and to complete land survey and registration throughout the country. In addition, the existing land law provides that tenants shall have priority in buying land if it is for sale. Measures protecting occupants include compulsory reduction of ground rent and limitation of the landlords' right to change or dismiss tenant farmers. An example of the creation of independent farmers is found in Kansu, where the Huanghui canal was recently completed. The farmers are given about four acres of land to be paid for in five years, beginning with the third year of ownership. According to the conditions regulating the distribution of the land, each plot must be owned as one whole unit and must not be divided up by the family who owns it.

Another organization recently created to help tenant farmers is the Land Finance Department of the Farmers' Bank of China, which is undertaking the functions of a land credit bank. The

Department issues land bonds, which are used mainly to help the Government to buy back land from landowners whose land value assessments are deemed too low, and to enable tenant farmers to purchase the land they cultivate. The Government can redistribute the land it purchases to tenant farmers, who may repay the purchase price in instalments. These measures are being put into operation first in the provinces of Szechwan, Kwangsi, and Hunan, where the farmers need relief from exorbitant rents.

Rural Finance

The Government has set out to provide cheap agricultural credit, first by granting agricultural loans through the ordinary banking system and secondly by encouraging still further the development of co-operative banks.

Agricultural Loans. The administration of farm loans has been placed in the hands of the Joint Board of the Four Government Banks. In 1940 the Board set up a rural finance department to co-ordinate the work of the four financing agencies handling rural credits—namely, the Farmers' Bank of China, the Bank of China, the Bank of Communications, and the Central Trust. Farm loans amounting to $498,561,000 were extended by these banks during 1941 for the purpose of rural rehabilitation. Nearly one-third of this sum was granted to Szechwan, while smaller proportions were allocated to Hunan, Kwangsi, Kansu, and Shensi. The Farmers' Bank gave the biggest amount, and since 1942 has been designated as the sole agent for the extension of rural loans.

Rural Co-operative Banks. Since the outbreak of war great emphasis has been laid on the establishment of rural co-operative banks and granaries. They serve to protect the interest of the farming population by providing loans and storage places at low interest rates, and by furnishing marketing facilities at the same time.

There are nearly 400 co-operative banks in Free China, over 100 of which are in Szechwan. About 100,000 rural co-operatives have dealings with these institutions through which farm loans are made. Financial help is given to the banks by the Joint Board of the Four Government Banks, the provincial banks, the provincial co-operative banks, and the administrative organs for the co-operative movement. The Joint Board extends loans to rural co-operatives at monthly interest rates of 1 per cent., which in turn charge 1·2 per cent. monthly interest, by far the lowest rate prevailing in rural areas. These loans, which are given only to soundly organized co-operatives

or farmers' associations, may be repaid in instalments spread over from one to ten years.

The granaries are operated on a mortgage basis, undertaking at the same time the marketing of agricultural produce. They grant loans at low interest against the security of the farm produce, thereby affording the debtors a respite until prices have risen a little for them to sell more profitably. By the end of 1939 altogether 41 large granaries and about 100 small ones had been organized in Szechwan, Kweichow, and Kwangsi.

The Co-operative Movement

The extension of co-operative organization among Chinese peasants has been very rapid since 1937. A sustained effort has been made to promote them in those places where the movement has not yet gained a firm foothold. From before the war to the end of 1940 the co-operative societies had nearly trebled in number. At that time the 146,000 rural societies registered with the central authorities, including the 103,000 properly established co-operatives and others in a less advanced stage of development, had a total membership of approximately 7,500,000. Of the properly established co-operatives over 80 per cent. were credit societies, while the remainder were divided among producer, transport and selling, consumer, supply, and public utility units.

An outstanding war-time development is the organization of the industrial co-operative societies, a description of which will follow later (see pp. 152–8).

FORESTRY

Disafforestation is regarded as one of the greatest defects of China's economy. A large proportion of the country once was adequately and in places densely wooded, but centuries of ruthless and often wanton cutting have denuded large areas. It has been estimated that of the total area of China Proper only 8 per cent. (approximately 118,000 square miles) is forested, as compared with 56·6 per cent. for Japan Proper, 13 per cent. for India, and 5·4 per cent. for Great Britain. The striking contrast in Japan Proper is due to the fact that the forests had been carefully preserved for a long period prior to the modern era, and are now state-owned and are methodically replaced. China does, however, utilize about one-fifth of her land for the growing of grass and bushes for fuel purposes.

Historical Background

There is evidence to show that at one time a great forest belt extended from central and south-eastern China all the way to north-eastern China, where it linked up with the forests of north-eastern Manchuria by way of the Khingan mountains. Large areas in the mountainous interior must also have been covered with forests. For various reasons many of these forests have been destroyed ; in the pioneer zones, the firing of forests and mountain vegetation to drive out wolves, leopards, and tigers has doubtless played an important part in forest destruction. Large-scale cutting of forests for building materials seems to have followed periods of rebellion and political disorder. During the Taiping rebellion extensive tracts of forests, especially those surrounding temples, were destroyed. Following the outbreak, the cutting of available forests was greatly increased to repair devastation in Chekiang, Hupeh, Kiangsi, Anhwei, and Kiangsu.

During the last two hundred years, however, records indicate that, particularly in North China, the destruction of forests has been carried out primarily to clear the land for cultivation. Probably in response to the recorded increase of population since the middle of the eighteenth century agriculture has spread to mountainous and hilly land which have been cleared of their forest cover. The destruction of the forests and the cultivation of the upland areas is believed to be responsible for the acceleration of erosional processes which has reduced the aggregate productive capacity of large areas in central and northern China. Over extensive areas the growth of a forest cover has also been impeded by the annual cutting of the vegetation to provide fuel for the villages and cities. This practice prevents the growth of a great variety of sprouting hardwood-tree species which exist in the mountains.

It is, however, a mistake to regard this general destruction of forests as entirely a result of ignorance on the part of the Chinese of the principles of forest management. The precept of Mencius, ' Take the axe into the forest at definite intervals of time, then more timber will be available than needed,' is a statement of sound forest management, and in the management of their timber reserves the Chinese have often displayed much skill. The village trees, temple forests, and bamboo groves are in fact evidence of a knowledge of forest aesthetics and products. The bamboo grove, so familiar a sight in central and south China, represents a highly specialized forest culture. In the temple forests principles of sound forest management have usually been applied.

Distribution of Forests

A relatively small part of China is now covered with forests. In the north there are a few scattered remains of the forests which once occurred in Shansi, but over the greater part of the area,

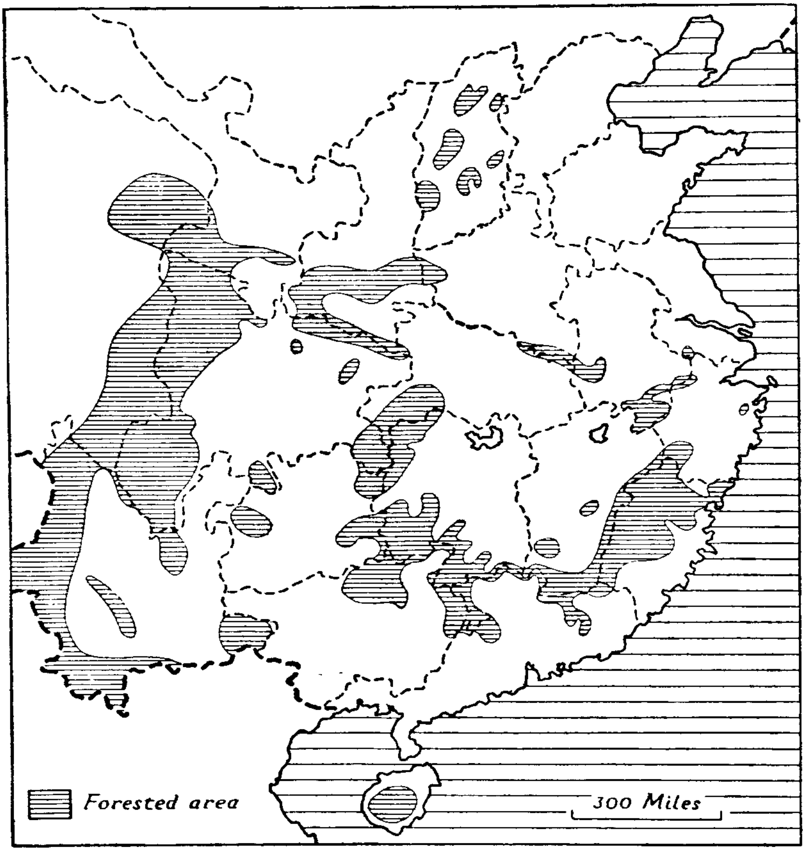

Fig. 25. The distribution of forests

Based on Buck, J. L., *Land Utilization in China : Atlas*, p. 45 (Nanking, 1937). The shading shows the general distribution of areas within which a considerable proportion of the land is covered by forests. In Shansi, however, the shaded areas indicate districts where there are remnants of forests, which formerly had a wider extent.

particularly in the North China Plain, they have given way to cultivation. The largest reserves exist in the west and in some of the uplands of the south of China (Fig. 25). Virgin forests have been reported in western Szechwan, but they are not entirely continuous

and lie in belts determined by elevation, by the cultivated valleys below 10,000 ft. and by the upper tree limit at about 13,000 ft. There are also extensive forest areas in Fukien and other parts of South China, where a good deal of forest area is under regular management, the land being reafforested after it is cut down (Plate 23). Even here, however, extensive forests of big trees are comparatively few and far between.

While China boasts a large number of species of indigenous timber trees (see vol. i, Chapter ix), only a limited number are of much importance. In North China there are 8 or 9 species and varieties of poplar of which white poplar (*Populus alba*), the Chinese white poplar (*Populus tomentosa*), David's aspen (*Populus tremula davidiana*), and the Japanese poplar (*Populus Maximowiczii*) are the largest and most important as timber trees. Pines are found in the foothills, but they are usually cut at an early stage of growth ; spruce and larch occur in the higher mountains. In the Yangtze valley there are many valuable species of pine, and the Chinese juniper (*Juniperus chinensis*) grows extensively all over the great plain of Kiangsu and Chekiang, between the Yangtze and the Tsientang rivers. In South China the camphor (*Cinnamomum camphora*), tung-oil (*Aleurites Fordii*) and wood-oil (*Aleurites montana*) trees are important economically ; chestnuts and walnuts are also found, as well as various species of oak. Throughout China from the Hwang ho southwards the bamboo is of the greatest economic importance, while from the Yangtze valley southward the coir-palm (*Trachycarpus fortuneii*) is also of economic value.

South China. The coastal provinces of South China are among the most favourably situated regions in China for the development of a permanent forest industry. The physical conditions are suitable and many areas are still covered with forests: the most important area producing commercial timber is found along the Min kiang of Fukien. Extensive tracts of mountain country are given over to fuel production for the markets in the densely populated plains. Erosion is kept down by the rankness of the growth of wild vegetation on cleared land (Plate 24).

Of outstanding importance is the pine, which is used for poles and for supports and rafters in buildings. Next comes fir, which is sawn into lumber for house construction, shipbuilding, and tea-chests. It requires a hundred years for either pine or fir to attain a diameter of 1 ft., but many trees are felled after 30 or 40 years. Foochow is the principal timber market, and shipments in peace-

time are mostly to North China and the Yangtze valley (Plate 25). Bamboo is another important product, and 40 species, cultivated or wild, have been named. It grows rapidly and is used for a variety of purposes. From it are made fences, screens, baskets, penholders, tobacco pipes, mats, fishing nets, brooms, scaffolding and ladders, musical instruments, stools, chairs, tables, and chop-sticks. It is also made into paper, used for reinforcing concrete, while the tender sprouts are an important article of diet. In the south of China the value of bamboo cannot be overstated.

The main forestry problem is the formulation of a system of management rather than planting in regions where bare areas are quickly covered by natural vegetation. This would limit planting to desired species, for, with adequate protection, forests would soon return to such lands. Planting is necessary only for the production of soft-wood timber.

Central China. In the Yangtze basin the primitive vegetation, as evidenced by temple forests, was rich in species and density over wide areas, especially in Hupeh and Szechwan. Although much of it has been destroyed, forest products totalling enormous amounts have been produced. One of the largest timber-producing regions in China is located in Hunan and Kiangsi. The products are *Cunninghamia* poles and pine logs. Before the war some camphor wood was also shipped down the Yangtze to the large cities in the lower basin. Huge rafts were made up in Hunan and were floated down the Yuan and Yangtze rivers to Nanking and Shanghai, where native timber competed with imported timber from the United States and Manchuria. In the western part of the Yangtze basin the tung tree is extensively cultivated for wood oil, which has become an important item in the export trade. The mulberry tree is grown over wide areas in connexion with the silk-producing industry. As in South China, the bamboo is generally cultivated in groves and forms a conspicuous feature of the landscape (Plates 26, 150).

North China. In North China the forestry problem reaches its most critical proportions. The forest cover has been largely destroyed except for temple forests and the remnants at high elevations. The demand for timber is much larger than the supply, and in parts of Shensi the only articles of wood within a house are chopsticks, and only the door and the paper window lattice of the house are of wood. In the valley of the Wei ho, extensive farmwood lots of *Populus simonii* are cultivated and irrigated to provide constructional material. The mountainsides, however, are closely shaved every autumn for fuel.

Plate 21. Water buffaloes, Fukien

Water buffaloes on the shore of Kulangsu island, Amoy.

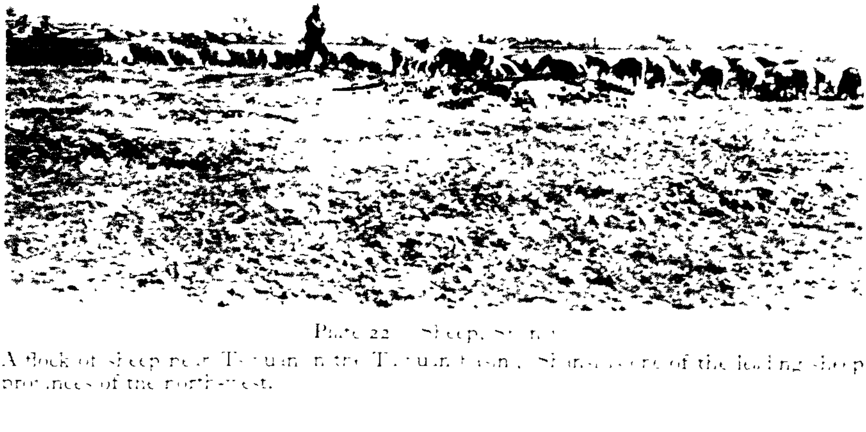

Plate 22. Sheep, Sh[illegible]

A flock of sheep near T[illegible] in the T[illegible] basin. Sh[illegible] is one of the leading sheep provinces of the north-west.

Plate 23. Reafforestation, Fukien
A hillside near Shaowu, replanted with fir.

Plate 24. Timber rafts near Hangchow
Rafts of *Cunninghamia* poles brought down from the forests of the Hangchow Basin.

It is rather surprising to learn that the great delta plain of the Hwang ho not only grows the timber that it requires for construction purposes, but in peace-time actually exports considerable quantities of logs of *Paulownia tomentosa* to Japan for sandals and poplar (*Populus tomentosa*) to match factories. There are no forests in the plain, but this demand is covered by the village trees, which are grown according to a system. Nurseries dating back to ancient times are still in existence to supply seedlings and cuttings for planting. In Shantung scrub-oak provides food for the caterpillars of the wild silk-moth which yield tussah silk.

The chief problem in forestry for this region is erosion control (see vol. i, Chapter vii). The forests have been ruthlessly cut down in the past, the soil has been washed from the mountainsides and large areas, particularly in the Loess Plateaux, are unfit for cultivation. The reafforestation of these areas will be a slow and difficult process, and all the resources of scientific control and government will be needed.

Afforestation Policy

In the early years of the twentieth century the Imperial government began to recognize the importance of forestry in the national economy. The first step taken was the establishment of a forestry school at Mukden in 1907 which was intended to lay a foundation for future development. The appointment of a foreign adviser to the Bureau of Forestry at Peking in 1913 was further evidence of the interest of the authorities in this question. After the outbreak of the war of 1914–18, however, interest waned and even under the National Government attempts at forest conservation and the afforestation of denuded mountain areas have not been very successful.

Prior to the Sino-Japanese war, the well-known Chinese fir or Foochow pine (*Cunninghamia lanceolata*) was deliberately cultivated in more or less extensive stands on the hillsides in south-eastern and southern China, but this was practically the only tree-planting of economic importance in the country. In 1936 it was reported that a certain amount of forest conservation and tree-planting was being carried out in the upper basin of the Hwai river in northern Kiangsu and in the adjacent parts of Anhwei. In north-eastern Hopeh, Shantung, and elsewhere along the coast the American locust tree (*Robinia pseudoacacia*) was being introduced along railways and especially at such places as Chinwangtao and Tangshan, where the

Kailan Mining Administration coal mines are located and where timber was required for pit props. The plane tree (*Platanus acerifolia*) was another tree which was being introduced, and was especially in evidence in foreign concessions and settlements in the treaty ports.

In western China, prior to the war, provincial authorities and industrialists were working on schemes for the scientific exploitation of the virgin forests. In this way it was hoped that Szechwan would be able to satisfy its own requirements instead of importing timber from abroad.

War-time Developments, 1937–44

Since 1937 the National Government has been more active, and is trying to conserve and develop the forest resources of the country on a scientific basis. In August 1941 the investigation and research of forestry was placed in the hands of the National Forestry Research Bureau of the Ministry of Agriculture and Forestry. Important investigations and surveys are being made in the border areas of Szechwan, Hunan, and Kweichow. Forestry administration may be reviewed under the three headings, namely, the protection of natural forests, the development of timber forests, and the development of provincial forests.

Protection of Natural Forests. Since 1940 the Ministry of Agriculture and Forestry has selected a number of forest areas called 'nationally owned forests,' for each of which an administrative bureau has been organized. There are seven such bureaux, and their distribution is as follows:

National Forest Administration	Location	Date of Inauguration	Area of Natural Forests (square miles)
Tsinling shan	Chowchih, Shensi	Aug. 1941	4,871
Tao ho	Minhsien, Kansu	July 1941	12,175
Min kiang	Lifan, Szechwan	July 1941	848
Tatu ho	Opien, Szechwan	July 1941	417
Tsingyi kiang	Tienchuan, Sikang	Feb. 1942	295
Kinsha kiang	Likiang, Yunnan	June 1942	under survey
Kilien shan	Kiuchuan, Kansu	April 1942	under survey

Source: Chinese Ministry of Information, *China Handbook*, 1937–1943, p. 599 (New York, 1943).

Prohibition of deforestation is the general policy for the protection of these natural forests. In these areas registration is required for the ownership of private forests, for legitimate felling and related enterprises.

Development of Timber Forests. The Ministry of Agriculture and Forestry has drawn up plans for the development of timber forests, which produce lumber for military, transport, industrial and general constructional purposes. The Ministry is establishing model timber forest areas and encouraging private dealings in the enterprise. Four model timber forest areas have so far been organized, as shown in the following table :

Model Forest Reserves in 'Free China' (October 1942)

Timber Forest	Location	Time of Establishment	Kinds of Timber and its Uses
1st Timber Forest	Chenyuan, Kweichow	April 1941	Tung-oil and fir trees for manufacturing oil and paper.
2nd Timber Forest	Lunghsien, Shensi	March 1941	Walnut and chestnut trees for military engineering.
3rd Timber Forest	Lochang, Kwangtung	March 1941	Camphor and dwarf-nettle trees for medicinal use.
4th Timber Forest	Mengtsz, Yunnan	—	Cinchona and rubber trees for medicinal and industrial uses.

Source : Chinese Ministry of Information, *China Handbook*, 1937–1943, p. 600 (New York, 1943).

The First Timber Forest Area at Chenyuan consists of $13\frac{3}{4}$ acres of seedlings of which $2\frac{1}{4}$ acres are planted with 195,000 tung-oil and fir seedlings. The Lunghsien Timber Forest Area covers more than 30 acres and the nurseries of the Lochang Area a similar extent, in which over 178,000 camphor, dwarf-nettle, and tung-oil seedlings have been planted. The Mengtsz Timber Forest Area is still in the preparatory stage.

Provincial Forests. Another important project of the Ministry of Agriculture and Forestry is to supervise provincial and *hsien* governments to promote afforestation work in their respective areas as a means of encouraging the people to engage themselves voluntarily in tree-planting. By August 1942 fifteen provinces in 'Free China'

achieved the following results in forestry under the direction of the forestry authorities :

Record of Forest Seedlings and Planting Work in 'Free China' (*August*, 1942)

Province	Area of Nurseries	No. of Seedlings	No. of Trees Planted
	acres		
Chekiang	166	14,330,078	85,779,494
Yunnan	165	9,315,000	65,223,900
Ninghsia	87	3,778,650	16,762,204
Kwangtung	886	4,757,984	48,570,243
Honan	666	13,792,169	19,966,936
Hupeh	42	3,197,838	845,673
Tsinghai	44	36,000	3,433,190
Szechwan	370	18,402,587	—
Kwangsi	648	145,706,454	113,889,512
Kweichow	424	14,124,182	200,000
Hunan	269	31,685,650	516,099,487
Kiangsi	352	12,000,000	11,511,318
Shensi	156	20,398,490	10,664,525
Kansu	202	5,068,204	680,708
Fukien	22	1,949,926	10,075,410
Total	4,499	298,543,862	903,702,691

Source: Chinese Ministry of Information, *China Handbook*, 1937–1943, p. 601 (New York, 1943).

In spite of the conservation efforts of the National Government the wanton and indiscriminate felling of trees continues to be a major problem and largely stultifies attempts at reafforestation. The exorbitantly high price of timber under war-time conditions has made it difficult for the soldiers and peasantry to resist the temptation to cut down trees.

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Chapter II

FISHERIES

General Conditions : Fresh-water Fisheries ; Salt-water Fisheries.
Survey by Provinces : Hopeh ; Shantung ; Kiangsu ; Chekiang ; Fukien ; Kwangtung.
Organization and Research : War-time Developments, 1937–44.
Bibliographical Note.

General Conditions

Although China has a coastline of approximately 3,000 miles, the sea has never played an important role in the life of the people. In most of the coastal areas agriculture is the dominant occupation, while fishing provides a subsidiary source of income. Consequently, only a small proportion of China's million fishermen were engaged in the industry on a full-time basis prior to the outbreak of the Sino-Japanese war in 1937. Along the coasts of southern Kiangsu, Chekiang, Fukien, and Kwangtung, however, marine activities assumed major dimensions, and of these, fishing, in certain localities, is the most distinctive occupation.

Production figures for the whole country cannot be given accurately but an estimate in 1934 put the total yield of fish, both marine and fresh-water species, at about $300,000,000 in value. Only in the coastal towns and cities are fresh sea-fish available as food ; inland centres have to depend upon what is taken in freshwater, or else salted and dried products. Of the sea-fish the hairtail ranks first in commercial importance, for, besides being eaten fresh, large quantities are shipped, salted and dried, into the interior. A species of corvina, known to the Chinese as the *Hwang Yu* or yellow fish (*Corvula argentata*), is probably the most important in the fishing industry after the hairtail. Cuttle-fish, porgy, tassard, ray, flat-fish, herring, mackerel, prawn, and crab are also caught for local markets, while the North Pacific cod is occasionally to be had in the Gulf of Pohai. Southwards from Chekiang marine fish are most closely related to those of the Philippine area, and tropical varieties become plentiful.

Fresh-water Fisheries

Fresh-water fish are partly raised in artificial ponds and partly caught from lakes and rivers, where fishing is carried on mainly

with lines, dip nets, and cast nets (Plate 28). Pisciculture is a very long-established industry, and has been developed to such an extent that in certain localities 60 per cent. of the land are occupied by ponds. It provides a useful supplementary source of income to a large number of farmers in the low-lying regions of the Yangtze and Si kiang basins. The industry is particularly well developed in the silk districts of Kiangsu and Chekiang, where the silkworm waste is used as fish food, whilst the bottom mud, which is rich in organic material, is removed from the pond and used as fertilizer for mulberry and fruit trees. The bulk of the 'domesticated fish' consist of *Lien Yu* (*Hypophthalmichthys molitrix*), the 'blue fish,' the silver carp, and the bream. 'Blue fish' are most highly prized for their edibility; they are stocked in ponds and marketed when only half-grown (Plate 27).

The fish are artificially raised either in the *chi* or the *tang*. The former is an artificial pond dug to a depth of a few feet and flooded; the *tang* is a portion of a lake or broad stream enclosed with bamboo pickets or a stockade. Although pisciculture is highly profitable a certain amount of risk is involved. In the rainy season the ponds often overflow their banks and the fish escape. Sometimes the stock is depleted by deadly infectious diseases which breed quickly in stagnant waters during dry spells. Thousands of fish may die in a few days if such diseases break out, and the only means of prevention is to pump fresh water into the pond in order to protect the fish from the heat of the sun. In the *tang* losses from diseases are slight, but from escape are heavy, caused by flood or defective stockading.

Salt-water Fisheries

The fishing industry is badly organized and has not been developed along modern lines. In 1936 the unit of operation was still small, and capitalization was on an insignificant scale. The general run of Chinese fishermen were engaged in fishing on a part-time basis, and did not regard it as a permanent vocation. Only a small proportion possessed fishing boats and implements, and the majority had either to form partnerships and hire equipment, or obtain employment on fishing vessels on a wage basis. They usually supplemented their slender capital resources with loans obtained from the fish *hong*, who served as middleman between the fishermen and the general public.

Prior to 1937, China had about 100,000 fishing vessels of various

types. They were most numerous off the south-eastern coast, where thousands of small junks used to go out into the open sea and near-shore fisheries. These vessels were mainly built of Chinese fir, and were furnished with mat sails ; in some places, however, canvas was beginning to replace matting for sails. Junk crews of five to thirty persons were found according to the size of the junk and the type of fishery pursued. Lining junks, for instance, require more persons in the crew than trawling junks.

Chinese fishing craft were not normally absent from port for more than two or three days at a time. Many of them were unseaworthy, and few modern steam trawlers were in commission. In sea fishing methods are very varied and include lines, drift and gill nets, seines, traps, filter nets, stake nets, and trawling. Trawls are of two types, the beam trawl and the Chinese trawl. The latter is becoming an important gear in South China and is operated by two junks towing it between them.

The Chinese sea-fishing industry was not only badly organized but also severely handicapped by lack of refrigeration and cold-storage facilities in the ports and by poor and slow transport facilities to take fresh fish to inland towns. Consequently the greater part of the catch has to be dried and/or salted by the dealers before it can be dispatched inland. Furthermore, in spite of the efforts of the government to introduce modern ideas and practices, the fishermen continued to employ the primitive methods handed down from one generation to another. For these and other reasons the Chinese were forced to give way to better-equipped Japanese poachers, who made repeated incursions into national fishing grounds and territorial waters in the years preceding the war.

Survey by Provinces

Chinese fisheries may be conveniently considered by provinces, and in the following treatment the fisheries will be briefly described and the important fishing ports indicated.

Hopeh

The broad plains and extensive muddy shores have not been conducive to a marine interest. Nevertheless, there is an important fishing industry based on Tientsin and adjacent towns, which employed some 200,000 fishermen and over 6,000 vessels in peace-time. The fish catches consist mostly of *Hwang Hwa Yu* (*Collichthys*

lucida), a species allied to *Hwang Yu* but smaller in size), hairtail, flounder, grey mullet, and lobster, and were valued at $5,500,000 in 1934.

Shantung

Around the rocky peninsula of Shantung there are many excellent harbours and an extensive fishing industry has grown up. The fish catches consist mainly of *Hwang Hwa Yu*, mackerel, porgy, and lobster.

Tsingtao and Weihaiwei are the most important centres. Tsingtao, situated on a headland between Kiaochow wan and the Yellow sea, is exceptionally well favoured. The Japanese were rapidly increasing their influence in the years before 1937, and were using it as a base for their trawlers and other fishing vessels which were operating in the Yellow sea. Around Weihaiwei many of the villages are largely dependent on fishing, and most of the catches, which consist of *Hwang Hwa Yu*, plaice, ray, and shark, were exported in peace-time to ports such as Canton, Hong Kong, Shanghai, Foochow, Tientsin, and Tsingtao. A large proportion of the catch landed at Tsingtao was sent on to the North China market.

Kiangsu

The important Kiangsu sea fisheries cover nearly the whole littoral zone of the province. Those located between Tsungming island and the Chekiang sea provide the most plentiful catches, though good hauls are forthcoming farther north.

In a normal year (1933) fishery products represent a total value of $30,000,000, to which must be added another $15,000,000 worth of fresh-water fish produced in the lakes and ponds of the interior. The most common catches consist of the *Hwang Yu* and the *Hwang Hwa Yu*. The season begins in March and continues until May or June. In September the fishes return to their old haunts in large shoals, from which plentiful catches are obtained. Tunny and sword-fish are popular on the market, and the shad is highly prized as a food-fish. Sharks are caught for their fins, which provide one of the most costly marine delicacies. Cod-fish and eel are obtained in the slack seasons during spring and winter: cod-fish liver is used to prepare cod liver oil emulsion. There is also some cultivation of shell-fish, including shrimps, prawns, crabs, and oysters.

The importance of Shanghai as a fish distributing centre can be realized from the fact that it handled about one-third of the fish and

marine products marketed in China in 1934. Marine products are brought in from the shores of the provinces of Kiangsu, Chekiang, Fukien, and Shantung, and fresh fish from the Yangtze valley. The organization of the fish trade was greatly improved by the setting up of the Shanghai Fish Market in 1936. This facilitated the unloading and distribution of the fish, and made possible the regulation of supply in accordance with demand.

The sea-fish are brought to the market by fish importers who keep cold storage boats known as 'ice boats.' Several hundreds of these used to ply between Shanghai and fishing centres like Chengshan. The ice boats buy the fish from the fishing vessels on the sea and carry the cargo to the market where they are sold to the retailers through commission agents known as *Yu Hong*. In the Shanghai fish trade there are several classes of merchants: the importers bring the fish from the sea to retailers on behalf of the importers, and through the retailers the fish eventually reaches the consumer. The fish which comes to the Shanghai market consists chiefly of *Hwang Yu*, *Hwang Hwa Yu*, tunny, sword-fish, and cuttle-fish.

Chekiang

The fishing grounds of Chekiang province are among the most important in the whole of China. In 1934 there were over 328,000 fishermen and 23,200 vessels engaged in the industry, which had its main centres in Ningpo, Changtu, Shihpu, and Wenchow. The total yield of fishery products was estimated at more than $56,000,000.

The best-known sea fisheries are located in three areas: near the Chushan archipelago, off the coast near Ningpo; at Sanmen wan, south of Chushan archipelago; and farther south near Wenchow wan (Fig. 26). The staple products consist of *Hwang Yu* and *Hwang Hwa Yu*, sword-fish and cuttle-fish. Other species of less commercial importance are sea bream, tunny, shad, and silurus. *Hwang Yu* are caught during all seasons of the year, but the greatest catch is always obtained between April and June. During the season the fish migrate in large shoals, but in July and August they appear only in small schools, and although delicious in taste, cannot be brought to market in a fresh condition because of the summer heat. They are always preserved and sold on the market as 'summer salt fish.' In September and October the fish return to their familiar haunts in fairly large shoals, but not so large as in the spring. The spring shoals always appear near Wushan and Shengkiamen, where large numbers of fishing vessels gather during the season. The *Hwang*

Plate 25. Timber rafts at Foochow
Foochow is the principal market for timber from the forests of the Min kiang valley.

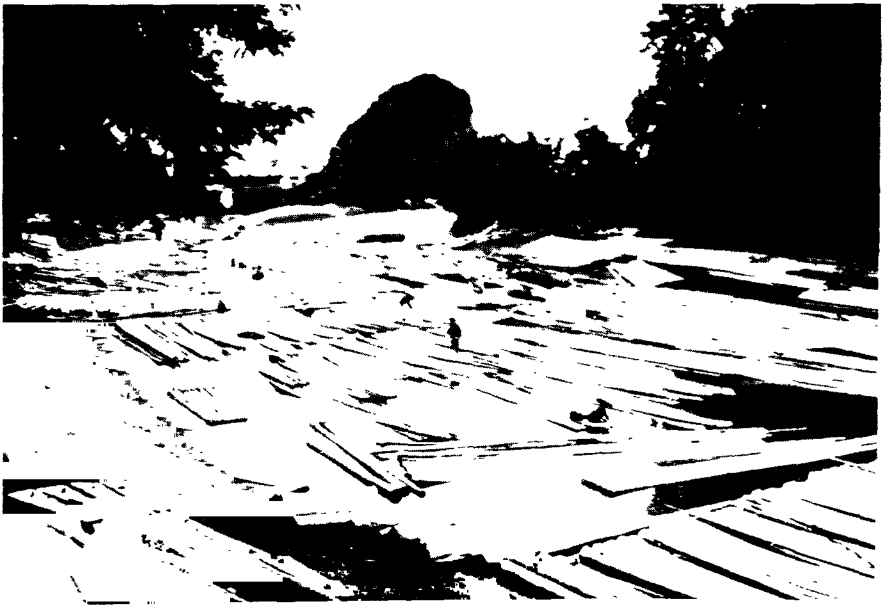

Plate 26. Timber on the Kwei kiang near Kweilin
The Kwei kiang is extensively used for floating timber down from the forests of the Nanling Belt

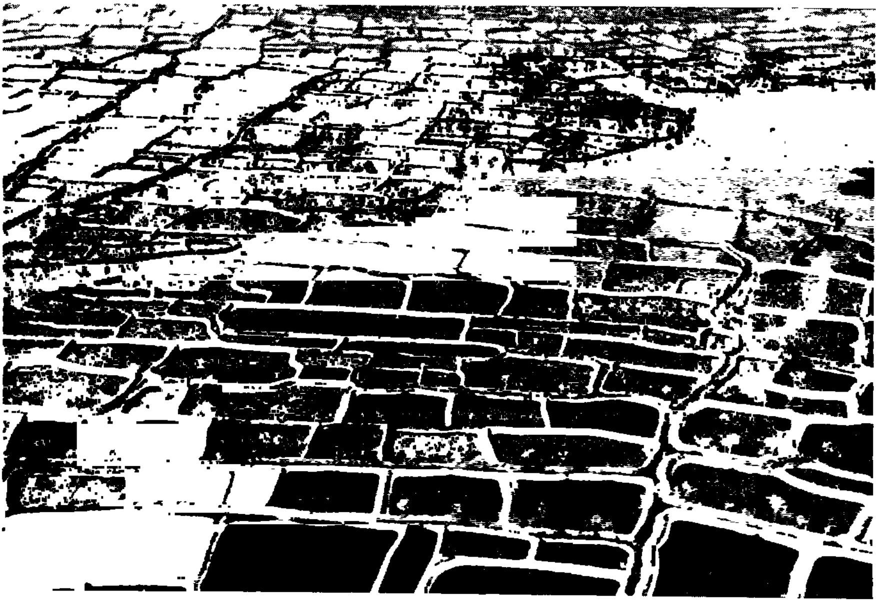

Plate 27. Fish farms, Tai hu
Pisciculture is a long-established industry in the Yangtze delta.

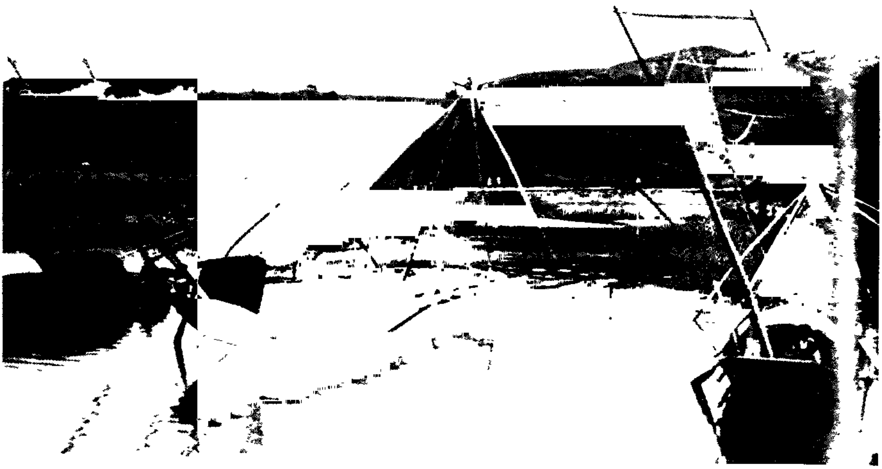

Plate 28. Fishing craft and nets, Yangtze valley
The nets are suspended on bamboo rods and can be raised or lowered at will.

Hwa Yu appear near Meishan in large shoals in late spring and early summer, but commercially are less important than the *Hwang Yu.* The bulk of the sword-fish is caught in Kiangsu waters, off Tsungming island, particularly in winter, whilst the other kinds of fish are usually caught in early spring and late summer.

Most of the fishermen are natives of Ningpo and Wenchow; their organization is backward, and they are handicapped by lack of capital and primitive fishing implements. Their vessels are of two kinds: the smaller kind is about 40 ft. from bow to stern and hardly over 15 ft. in beam, and is capable of carrying 3 to 5 tons deadweight. The larger kind is about 80 ft. from bow to stern, 20 ft. in beam, and capable of carrying 70 or 80 tons deadweight. A vessel of the smaller type is manned by four hands, and one of the larger kind by 8 or 9 hands. The fishing tools are crude and simple, consisting of a net made of ramie or flaxen strings. The net is about 400 or 500 ft. long, and 50 or 60 ft. wide, weighing from 30 to 50 lb. It is always attached to a spherical body of iron or fired clay, and also one or two buoys of hollowed wood. The former is used to weigh down the net and keep it in position in water, while the buoy indicates the location of the net. During the migratory season of the *Hwang Yu*, fishermen usually manage to detect the presence of a large shoal by the peculiar sound which the fish produce in the water. As soon as the shoal is located near or just above where the net is spread, the fishermen raise the net and a rich haul can always be secured. Other fish are also caught in this way, with the exception of sword-fish, which are obtained partly by net and partly by hook and line.

The fish markets in Chekiang are found in various seaports along the coast, including Taishan, Haimen, Chushan, Shihpu, and Ningpo. Ningpo, one of the great fishing centres of the world, is especially famous for the preparation of dried and salted fish which are exported to all parts of China. But most of these ports are not densely populated, and the local demand for fish is limited. The fishermen are, therefore, often compelled to dispose of their catches at Shanghai or other big towns through the medium of special fish agents, known to Shanghai fish dealers as 'fish guests.' These agents sail in junks between the fisheries and the main marketing centres, bringing in catches which are sold as soon as possible. They form an important link between the fishermen and the dealers, and without them many of the towns would not get any fresh fish at all.

A thriving trade has been built up on the artificial raising of

oysters and other kinds of shell-fish by people living along the southern coast of Chekiang. The shell-fish include several well-known species of oysters and cockles, and the abalone or earshell. The last named is prized not only for its meat but also for its shell, which is usually pulverized and made into plastic liquids for caulking or painting boats.

Fig. 26. Fishing centres, south-east China

Fukien

Important fishing centres are found in Siyang island, Nanlin, Peilin, Hushan, Yahpu, Sansha, Kuanton, Nanjisu island, Haitan island, Meichow, Amoy, Chingmen, and Tungshan. The fish catches consist mostly of hairtail, *Hwang Hwa Yu*, oysters, pilchards, tassard, shark, and pomfret.

Kwangtung

Along the coast of Kwangtung, with its numerous harbours and islands, fishing has always been an important occupation. The fishing grounds are in the districts of Nanao, Tolin, Swatow, Tahao, Haimen, Hong Kong, and Macao, and the fish catches consist of *Hwang Hwa Yu*, porgy, cuttle-fish, shark, and oyster. Special mention must be made of the great fishing industry of Macao and Lappa. In 1933 approximately 2,000 Macao junks were in commission, and, including the crews and those occupied in the branches of the trade on shore, about 55,000 men and women were employed. The average annual export, exceeding $4,000,000, was sent chiefly to Kongmoon, Tanshui, Kungyifow, Chikhom, Shekki, Canton, and Hong Kong (Fig. 26).

Among the fisherfolk, particularly in the province of Kwangtung, there is a considerable boat population who live permanently on board their fishing junks and know no other home. The crews consist of men, women, and children, these frequently being members of one or more families. Both men and women engage actively in fishing operations, the women being usually responsible for the lighter tasks such as the preparation of meals, baiting lines, and mending nets. Deep-sea trawlers from Kwangtung remain at sea from 7 to 14 days and usually salt their catch. A small percentage of these had been fitted with motors before the war.

Of interest also as another source of wealth to the district are the oyster fisheries. Those of the estuary of the Si kiang are highly valued, for, being produced in brackish water, they are more easily dried than sea-water oysters. Nearly every bay and village has its beds, from the Sunon district—where the important Shatsing beds are situated—to Sunning. The oysters are cultivated and require attention just as field crops do, and a large and hard-working class is employed in the trade. They are grown from the spat on beds of stones weighing about 3 lb. each, which are put there for the purpose. The young oysters appear after about five months and are ready for use in from three to three and a half years. In times of freshets from the rivers whole beds are taken up and carried by hand out to sea in order to preserve them from too great a share of fresh water, which kills the shell-fish. When required for use the oysters are cooked in large pans of water, after which they are partially dried in the sun for one day, or two if intended for export abroad.

Organization and Research

It was only after 1928, under the Nanking government, that the fishing industry began to receive from the administration and the general public the close attention it deserved. Experimental stations were opened, and fishermen were taught modern methods and the use of modern appliances in this connexion. More cruisers and coastguards were also provided to patrol Chinese fishing grounds, and thus limit the predatory activities of the Japanese. Then in 1934 the Chinese government began to put into effect the measures embodied in its Four Years Plan which were concerned with the revival and development of the fisheries. Most important was the establishment of the Shanghai Fish Market, which was formally opened to business in May 1936. This was an attempt to provide fishermen with a ready market for their catch, and to ensure, through the broadcasting of a day-to-day official price, that they should receive a fair return on their labour.

A Fishery Syndicate was also set up to provide loans to fishermen and fishing corporations which had relations with the Fish Market. In addition, an investigation was conducted into the general conditions of Chinese fishermen in other fishing districts, since it was intended that such loans, in order to serve their purpose, should be distributed evenly to fishermen and fishing corporations spread over a wide area.

On the eve of the Sino-Japanese war the Biological Institute of *Academia Sinica* had started on a survey of the fishing resources of the Chinese coast. For this purpose the coast was divided into four zones for investigation: from Weihaiwei to Chinwangtao in the Gulf of Pohai; from Kiangsu to Chekiang in the Yellow sea; from Chekiang to Fukien in the East China sea; and from Fukien to Kwangtung in the South China sea. The report on the first zone, published in 1937, was intended to be a preliminary effort towards the future development of Chinese fisheries.

War-time Developments, 1937–44

Since the outbreak of the Sino-Japanese war all this research has been in abeyance, and the fishing industry has suffered a serious setback. The entire Chinese coast has been blockaded by the Japanese navy, and as a result large numbers of Chinese fishermen have lost their livelihood. Although the government has adopted certain relief measures the majority are still suffering great hard-

ship. In the occupied territories the Japanese organized the Central China Marine Products Company in November 1938 to control the fishing business along the East China coast. According to one report the junk fisheries of Hong Kong have been reorganized under the supervision of two large Japanese fishing companies, while the sale of fish has been controlled by fishing associations. Many of the large Hong Kong trawling junks of 50 to 90 ft. in length are said to have been commandeered by the Japanese for military and naval use. Within ' Free China ' the authorities have turned their attention to the development of fresh-water fisheries. Their projects include the raising of fish fry, the stocking of rivers and fish ponds, and the promotion of research.

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2. In addition articles on different aspects of the fisheries of China appear from time to time in : *Sinensia, Contributions from the Metropolitan Museum of Natural History Nanking* (Nanking) ; *Contributions from the Biological Laboratory of the Science Society of China*, Zoological series (Nanking) ; *Bulletin of the Fan Memorial Institure of Biology* (Peiping) ; *Hong Kong Naturalist* (Hong Kong) ; *Journal of the Shanghai Science Institute* (Shanghai) ; and *Contributions from the Institute of Zoology, National Academy of Peiping* (Peiping).

3. Some statistical and other information may be found in : Woodhead, H. G.W. (editor), *China Year Book* (annually, Shanghai) ; Chinese Ministry of Information, *China Handbook* 1937–1943, p. 602 (New York, 1943) ; and Hou Chao-hai, ' Fisheries,' *Chinese Year Book* 1936–1937, pp. 1338–65 (Shanghai).

Chapter III

MINING

Power Resources: Coal ; Petroleum ; Water Power.
Mineral Resources: Iron ; Gold and Silver ; Copper ; Tin ; Lead and Zinc ; Tungsten and Antimony ; Manganese and Mercury ; Salt ; Gypsum and Alum ; Clay ; Sulphur.
War-time Developments, 1937–44 : Power Resources ; Mineral Resources.
Bibliographical Note.

The old conception of China's 'untold wealth' in coal and other minerals was rather rudely shattered when systematic scientific surveys and estimates were made under the auspices of the Chinese Geological Survey. These estimates are continually being revised, and are probably conservative rather than generous, but the general position is becoming clear. As will be seen, it warrants the assumption that China has an adequate physical basis for a very considerable industrial development to support and supplement her dominant activity of agriculture, but not for large-scale industrialism comparable to that of western Europe or eastern North America.

Power Resources

Under this head China's resources and potentialities in coal, petroleum, and finally water power are considered.

Coal

Reserves. As recently as 1913 China was credited at the International Geological Congress with probable coal reserves of nearly a billion metric tons, which ranked her second to the United States, although a very long way behind, and attributed to her resources greater than those of all the European countries combined. The initial estimates of the Chinese Geological Survey, made a few years later, were startlingly low in comparison with this figure. They were gradually raised, however, as the result of more detailed surveys, and the most recent estimate of a little less than 250,000 million metric tons is generally regarded as probably approximating to the real position. This means that China has far greater coal resources than any other country in the Far East, and more than those of any

single European country, but less than those of the United Kingdom and Germany combined. Relative to the size of the country and its total population, China is less well endowed with coal than either the United Kingdom or Germany.

The geographical distribution of the coal fields is a vital aspect

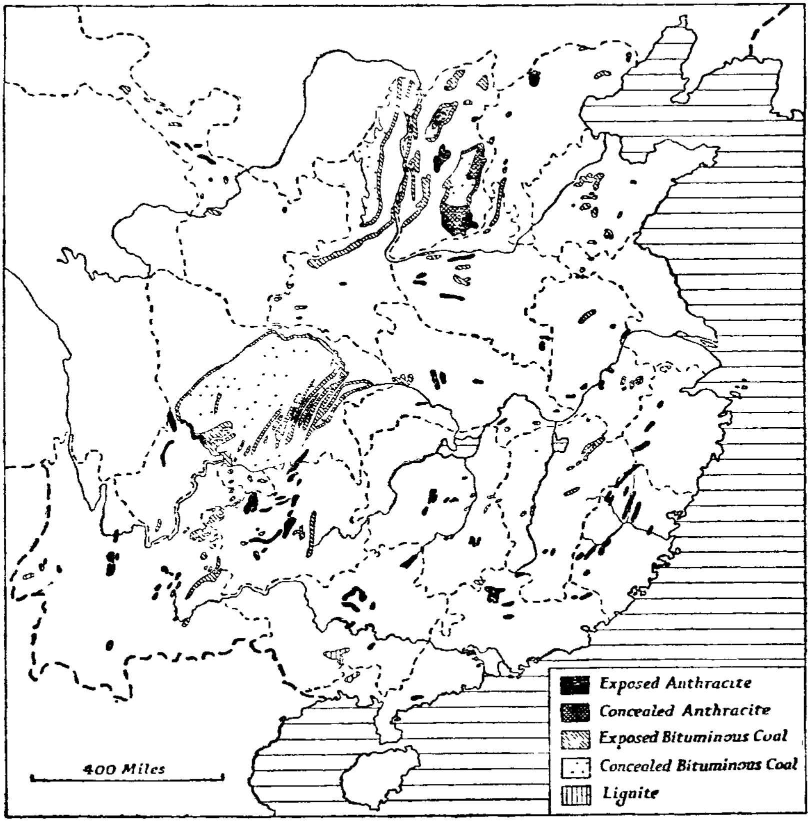

Fig. 27. Distribution of coal reserves

Figs. 27–29 are based on *New Atlas of China*, plate 6 (Shanghai, 1934).

(Fig. 27). About 95 per cent. of the total is in China Proper, and although the coal fields of Manchuria, under Japan's control, are actually much the most developed, they constitute only about 2 per cent. of the whole amount. Within the Great Wall almost every province of China has some coal, but there is an immense concentration in the Loess Plateaux of the north-west and in the adjacent portions of the plain (Honan). The single province of Shansi, with

an estimated total of 127,000 million tons, has more than one half, and the neighbouring province of Shensi with 72,000 million, more than one quarter. The aggregate regional total of Shansi–Shensi–Kansu–Honan constitutes over 85 per cent. of China's apparent reserves. These striking figures demonstrate both that in the north-west China has one of the major coal fields of the world, comparable in magnitude to those of Pennsylvania and the Ruhr, and that, apart from this, her supplies are rather meagre.

Of the remaining 35,000 million tons, nearly ten are attributed to Szechwan, the great western province, which ranks as the second largest coal region (4 per cent. of the total). Hopeh in the north is the only other province of China Proper to have more than 1 per cent. of the aggregate (3,000 million tons), and its coal fields are actually the best developed after those of Manchuria. The south-western group (Kweichow–Yunnan) and the provinces of the Central Yangtze Basin or south-central China (Hunan–Kiangsi) have moderate supplies. Shantung has several small but valuable basins, but the provinces of the lower Yangtze (Anhwei, Kiangsu, and Chekiang) and of the lower Si kiang (Kwangtung and Kwangsi) are undoubtedly deficient. The absence of important coal fields adjacent to the sea-board and the most developed industrial centres is a distinctly adverse factor in China's coal situation. The table on the opposite page is arranged to show the estimated provincial reserves, so far as possible in regional groups.

Certain useful generalizations can be made about the quality and character of Chinese coal:

(1) Nearly one-fifth is anthracite, an unusually high proportion; it is fairly widely distributed, although by far the greater part is in Shansi. Nearly all the rest is bituminous, lignite accounting for little more than 1 per cent.

(2) The distinction between the coal fields of Permo-Carboniferous age on the one hand and of Rhaetic-Lias and later Jurassic age on the other is of considerable economic importance. On the whole, although not invariably, the higher grade coals are associated with the Permo-Carboniferous horizons. It is these which predominate in North China, and particularly in the Shansi–Shensi regions. The coal fields of South and West China belong in the main to the later periods of coal formation, although there are some important Permian basins within the southern watershed of the Yangtze. The coals of the Red Basin of Szechwan, mainly of Rhaetic-Lias age, are friable and of relatively poor quality (Plate 29).

Estimated Coal Reserves of China (millions of metric tons)

Groups of Provinces	Anthracite	Bituminous	Lignite	Total	Percentage
1. North-west					
Shansi . . .	36,471	87,985	2,761	127,127	52·17
Shensi . . .	750	71,200	..	71,950	29·53
Kansu . . .	..	..	..	1,500	0·62
Honan . . .	4,455	3,309	..	7,764	3·21
Total . .				208,341	85·83
2. West					
Szechwan . .	64	9,810	..	9,874	4·05
3. South-west					
Yunnan . . .	11	1,485	131	1,627	0·66
Kweichow . .	774	775	..	1,549	0·64
Total . .				3,176	1·30
4. South-central					
Hunan . . .	1,043	721	..	1,764	0·72
Kiangsi . . .	216	776	..	992	0·40
Total . .				2,756	1·12
5. Central and Lower Yangtze					
Hupeh . . .	160	280	..	440	0·18
Anhwei . . .	60	300	..	360	0·15
Kiangsu . . .	25	192	..	217	0·09
Chekiang . .	22	78	..	100	0·04
Total . .				1,117	0·455
6. South-east and South coast					
Fukien . . .	291	105	..	396	0·16
Kwangtung . .	50	371	..	421	0·17
Kwangsi . . .	..	..	..	300	0·12
Total . .				1,117	0·455
7. North and North-east					
Hopeh . . .	981	2,088	2	3,071	1·26
Shantung . .	26	1,613	..	1,639	0·67
Total . .				4,710	1·93
8. Inner Mongolian					
Chahar . . .	17	487	..	504	0·21
Ninghsia . . .	166	322	..	488	0·20
Suiyuan . . .	58	396	22	476	0·19
Total . .				1,468	0·60
9. Tibetan Border					
Sikang . . .	..	..	..	..	..
Tsinghai . . .	..	..	..	500	0·21
10. Sinkiang . . .	..	..		6,000[1]	2·46
11. Manchuria . .	..	..	..	4,610	1·89

[1] The estimate for Sinkiang is no more than a guess.

Source: The Geological Survey of China, *The General Statement on the Mining Industry* (Peiping, 1935).

A later estimate, Chinese Ministry of Information, *China Handbook* 1937–1943, p. 481 (New York, 1943), gives: Szechwan, 5,986 (millions of metric tons); Yunnan, 2,341; Kweichow, 1,370; Sikang, 531.

(3) There is general agreement that the proportion of good coking coal to the total Chinese reserves is not high. North China and Manchuria again have an advantage over the south. Of the northern fields already developed those with good supplies of coking coal include the Fushun and Penchihu fields of south Manchuria, the Kaiping field of Hopeh, the Poshan and Ihsien fields of Shantung (Plate 31), and some fields at the base of the Taihang shan. The only important coking coal of South China comes from the Pinghsiang basin, on the Kiangsi-Hunan border (Plate 32).

(4) Geological conditions impose considerable difficulties in mining many of the Chinese coal fields. The strata are often highly faulted and disturbed by igneous intrusions, and serious pumping problems are often presented by water entering the mines through faults. Some of the richest fields in the north-west are concealed by thick beds of overlying sedimentary rocks. To this must be added the geographical disadvantage of the situation of most of the important fields far inland, and often in mountainous country difficult of access.

Production. Although the use of coal as a fuel dates back over 2,000 years, its production in the past, and even in recent times, has been hampered by inadequate mining equipment and lack of transport facilities. Prior to the Sino-Japanese war large-scale enterprise, in which foreign capital played an important part, accounted for much the larger proportion of China's total output, though native concerns operated by single proprietors or small partnership were found in nearly every field.

The distribution of the principal collieries bore little relation to the largest reserves, these collieries were located mainly near important lines of communications and developed in response to market demands in the urban centres along the eastern seaboard. Most of the mines were situated in the north, and it was only after the establishment of the Nanking government and the construction of additional railways that new enterprises were opened up in the Yangtze valley and in the province of Kwangtung.

Coal is easily China's most important mineral, yet annual production was estimated at no more than approximately 22 million tons in 1936, or only a little greater than that produced in Belgium. (The output of the important Fushun colliery of Liaoning, lost to the Japanese in 1931, would bring this figure up to 34 million tons.) Most of the coal was mined in the northern part of the country.

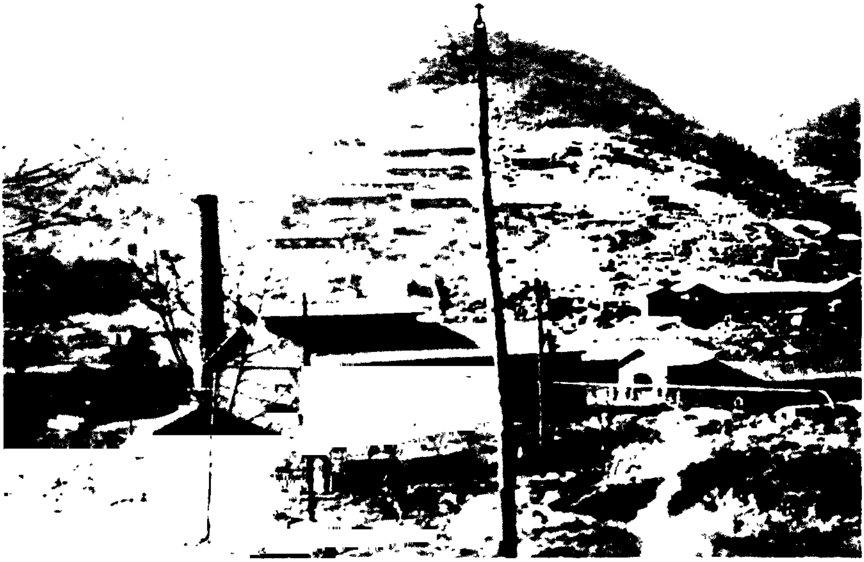

Plate 26. Coal mines, Szechwan

The mines of the Tientu Company (see p. 375), located near the [illegible] in the Kiangpei *hsien*, constitute one of the important sources of power for the new industrial district of south-eastern Szechwan

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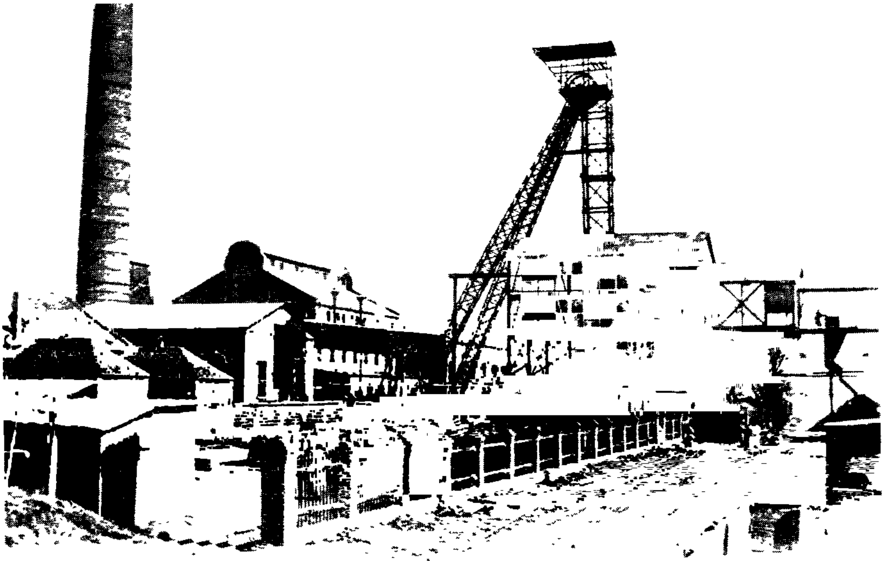

Plate 31. Ihsien mines, Shantung
The Ihsien field of southern Shantung yields good coking coal.

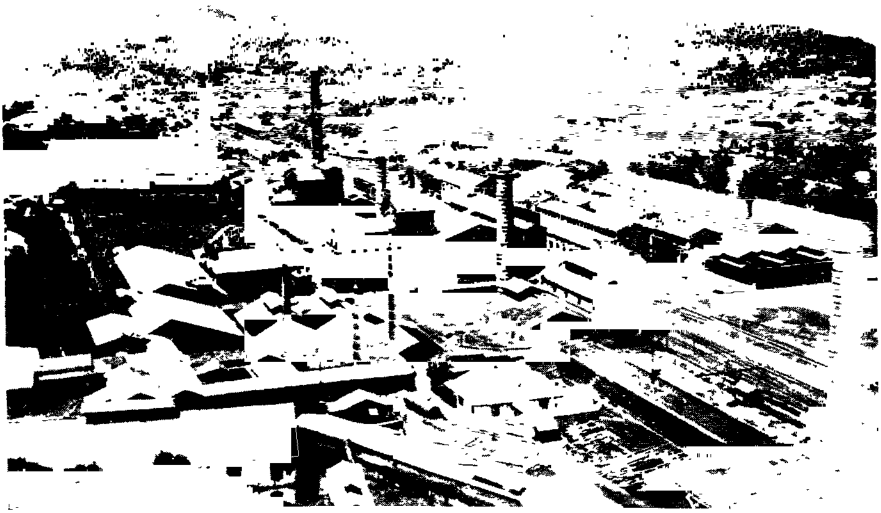

Plate 32. Pinghsiang colliery, Kiangsi
The Pinghsiang coalfield is the most important source of coking coal in South China.

About one-third came from Hopeh, and a considerable part of the remainder from Shantung, Shansi, Honan, and Anhwei, in that order of importance. This shows that northern China possesses not only the largest coal reserves, but that the coal-mining industry is more advanced there than in any other part of the country.

In 1936 there were 25 large collieries in China (excluding Manchuria) operated by well-organized companies often under joint Sino-foreign administration. The Sino-British Kailan Mining Administration, operating in the Kaiping basin, north-eastern Hopeh, was by far the largest single producer, with an average annual output of 6,000,000 tons of bituminous coal, some of good coking quality. It was not only the chief supplier of North China, but also shipped large quantities of coal to Shanghai and other parts in the Yangtze valley and the coastal regions of Fukien and Kwangtung. The second largest joint concern, also Sino-British, was the Chungfu Administration, formerly known as the Pekin Syndicate, in Tsiaotso, western Honan, producing over 1,000,000 tons of anthracite a year. A smaller Chinese-English enterprise—the Mentoukou Company, operating west of Peiping—had an annual output of about 30,000 tons, mainly anthracite (Plate 33).

None of the other mining companies in the country produced one million tons per year. The largest Sino-Japanese capitalized concern, the Luta Company, working at Weihsien and Tzuchuan, situated along the Tsingtao-Tsinan railway, had an annual output of about 700,000 tons, most of which was consumed locally (Plate 34). The Chinghsing mines on the Chengtai Railway were operated with combined German and Chinese capital and produced about 800,000 tons per annum. This company operated a coking plant at Shihkiachwang with a production of about 80 tons of coke daily. This was the only by-products plant in China Proper in 1936.

The most prosperous coal mine with entirely Chinese capital was operated by the Chunghsing Company of Tsaochwang in southern Shantung, situated on a branch line of the Tientsin-Pukow railway. This mine was one of the most prominent in the country because a large part of its output of 1,300,000 tons of bituminous coal was of good coking quality with a ready market all over China. About half of its products were sold to places along the Grand Canal and the Yangtze kiang, and to the Tientsin–Pukow, Lunghai, and Nanking–Shanghai railways. The Hwainan Mining Administration, another

important Chinese-controlled company, had a production of about 1,000,000 tons per year; its marketing problem was greatly eased by the construction of the Hwainan Railway.

In 1936 the total amount of coal produced did not cover domestic requirements and had to be supplemented by imports from French Indo-China, Japan, and British India. By far the largest consumers were the railways and the steamships, and other markets were found in the industrial centres of Shanghai, Hankow, Hong Kong, Tientsin, Peiping, Canton, and Tsingtao.

In the years before the Sino-Japanese War the average *per capita* consumption of coal in the country was only 0·055 tons. This figure was extremely low in comparison with the rate of four tons in Great Britain, Germany, and the United States of America. It was only 10 per cent. of the Japanese *per capita* consumption.

Production of Principal Coal Companies (thousands of metric tons)

Province	Company	1931	1932	1933	1934
Hopeh	Kailan . . .	5,356	5,205	4,284	4,755
	Chinghsing . .	605	642	706	795
	Chengfeng . .	350	220	200	300
	Mentoukou . .	107	221	300	350
	Liukiang . . .	255	173	157	158
	Yili	148	136	140	224
	Chungho . . .	1	. .	39	94
	Lincheng . . .	15	60	101	170
Shantung	Luta { Tzuchuan .	519	588	608	627
	Luta { Weihsien .	55	103	108	115
	Chunghsing . .	762	973	1,132	1,312
	Potung . . .	83	63	216	125
Shansi	Paochin . . .	487	522	433	. .
	Tsingpei . . .	108	243	124	242
Honan	Liuhokou . . .	506	751	520	516
	Chungyuan . .	840	872	1,139	910
	Minsheng . . .	74	22	63	63
Kiangsi	Pinghsiang . .	163	183	173	227
	Polo	. .	40	53	25
Anhwei	Hwainan . . .	31	67	165	218
	Liehshan . . .	42	85	126	85
	Tatung . . .	95	105	165	188
Chekiang	Changhsing . .	183	. .	198	200
Kiangsu	Huatung . . .	88	110	220	247
Hupeh	Fuyuan . . .	125	149	154	144

Source: Woodhead, H. G. W. (editor), *China Year Book* 1939, p. 469 (Shanghai, 1939).

Coal Production by Provinces (thousands of metric tons)

Provinces	1932	1933	1934	1936
Hopeh	7,365	6,286	7,739	7,575
Shantung	2,666	3,054	3,504	3,988
Shansi	2,431	2,466	2,700	2,866
Honan	2,280	2,286	2,130	2,266
Kiangsi	266	275	337	346
Anhwei	400	615	633	1,010
Chekiang	247	248	250	242
Kiangsu	130	402	267	367
Shensi	195	919	204	200
Hunan	910	976	889	919
Szechwan	603	618	638	663
Hupeh	339	366	458	563
Kwangtung	214	248	338	351
Yunnan	113	130	115	123
Kweichow	90	63	74	80
Chahar	192	216	202	247
Ninghsia	10	12	15	15
Suiyuan	69	57	58	72
	18,470	19,237	20,551	22,250
Manchuria				
Liaoning	7,158	8,850	10,656	..
Kirin	246	272	411	..
Heilungkiang	69	368	405	..
Jehol	45	87	356	..

Source: Woodhead, H. G. W. (editor), *China Year Book* 1939, p. 469 (Shanghai, 1939).

Petroleum

Reserves. In forms of power other than coal China's position is rather unfavourable. The petroleum resources of the country have not been fully explored, and notwithstanding war-time developments, enough is known to make it unlikely that there are any oil-fields of the first magnitude. The most promising regions within China Proper are the Red Basin of Szechwan and the basin of north Shensi, where small quantities of petroleum have been obtained from Mesozoic rocks for hundreds of years. Recent drilling operations have established the prospects of considerable supplies from parts of north Shensi, particularly Yenchang and Yenchuan districts, and the conditions in certain districts (Kiating and Tzeliutsing) of the Red Basin, where oil-bearing rocks occur, are also said to be promising (Fig. 28). Since 1937 oil has been obtained from Tertiary beds in western Kansu near the Chinese-Soviet Highway, and con-

siderable developments can be expected as soon as modern equipment can be installed.

Production. The amount of oil produced in China in 1936 was very small. The only modern distillation plant in the country was located at Yenchang, north Shensi. There were two producing wells, one dug in 1906 to a depth of 300 ft., and the other to 520 ft., but the combined output was not important. Though a number of localities (Tzeliutsing and Huochingkou) were producing oil in Szechwan, the quantity was insignificant even compared with that produced in Shensi. Some small amount of oil was collected from a seepage at Shihyoukou, south of Chungking, and Shuichiatsou, west of Tehhsien. A small quantity of oil was obtained from coking plants, the most important of which, the Shihkiachwang plant, operated by the Chinghsing Mining Administration, produced about 2,000 barrels per year. Outside China Proper the largest production came from the oil-shale distillation plant at Fushun, operated by the South Manchuria Railway Company after the occupation of Manchuria by the Japanese. Production, which began in 1930 after tedious and expensive experiments, rapidly increased, and in 1934 reached 650,000 barrels.

Oil Production of China Proper (barrels of 42 gallons)

	1931	1932	1933	1934
Yenchang, Shensi .	552	351	305	288
Kansu	100			
Szechwan	144	400	400	400
Sinkiang	300			
Chingsing, Hopeh .	1,593	1,500	2,482	1,925
Total . . .	2,689	2,251	3,187	2,613

Source: Woodhead, H. G. W. (editor), *China Year Book* 1939, p. 471 (Shanghai, 1939).

China's peace-time consumption of oil products was very low, and in 1936 was estimated at 1,134,000 metric tons. A large proportion of this was purchased abroad, mainly from the Dutch East Indies, the United States, and British Borneo. Kerosine was the most important item, though in consequence of the improvement of communications and the development of the industry imports of gasoline and fuel oil were increasing.

Water Power

The prospects for power from this source are certainly better than from oil, but in comparison with such countries as Canada, Switzerland, and Japan are no more than moderate. There is a clean-cut distinction between North and South China in respect both of the possibilities and the need for water power as a source of energy. The low rainfall and long dry season of North China make the volume of water in the rivers too variable and uncertain to be used for generating hydro-electric energy, and the only region which holds out any important prospect is the north-south section of the Yellow river between Shansi and Shensi, where there are many rapids. Here a capacity of 35,000 h.p. has been estimated as the result of a reconnaissance survey by the Planning Committee. But coal is so abundant in North China that it can supply the need for the greater generation of electric power.

In Central and South China the position is quite different. The coal supplies are much less widely distributed, and in particular the lower Yangtze basin, which, as the scene of the greatest industrial development, has the most need of power, and the coastal provinces of the south-east are definitely deficient. So it is fortunate that one of the greatest potential sources of hydro-electric power in China is in the centrally placed region of the Yangtze gorges (Ichang and Shasi in Hupeh province and Wanhsien in Szechwan). The estimated capacity of the Yangtze gorges is put as high as 4,000,000 h.p. Other potential sources are the rapids of the tributaries of the upper Si kiang (Yu kiang, Liu kiang, and Hungshui kiang), the Min kiang above the Chêngtu Plain, and the Tung ho in western Szechwan, and some of the rapidly flowing rivers of the coastal provinces of the south-east, particularly the Min kiang of Fukien. The potential water power of the mountain hinterland of the South-Western Tableland is probably very great, and it is interesting to note that the first installation for hydro-electric power in China was at Kunming in Yunnan as far back as 1912. On the whole, the prospects of hydro-electric energy in Central and South China are fairly good, and there is every incentive to develop it.

Mineral Resources

The dominance of the north in coal and iron is to some extent offset by the greater importance of the south and south-west in the non-ferrous metals (Figs. 28, 29). The latter come mainly from those

regions which were strongly affected by the great igneous activity associated with the Yenshanian movements of Mesozoic times, probably reinforced as a result of the later 'Himalayan' stresses. The most general statement is that China is not well supplied with the non-ferrous metals as a whole, but has a rich endowment in two or three of the rarest.

Iron

Reserves. The expectations concerning China's wealth in iron ore proved to be even more extravagant than those of her coal supplies

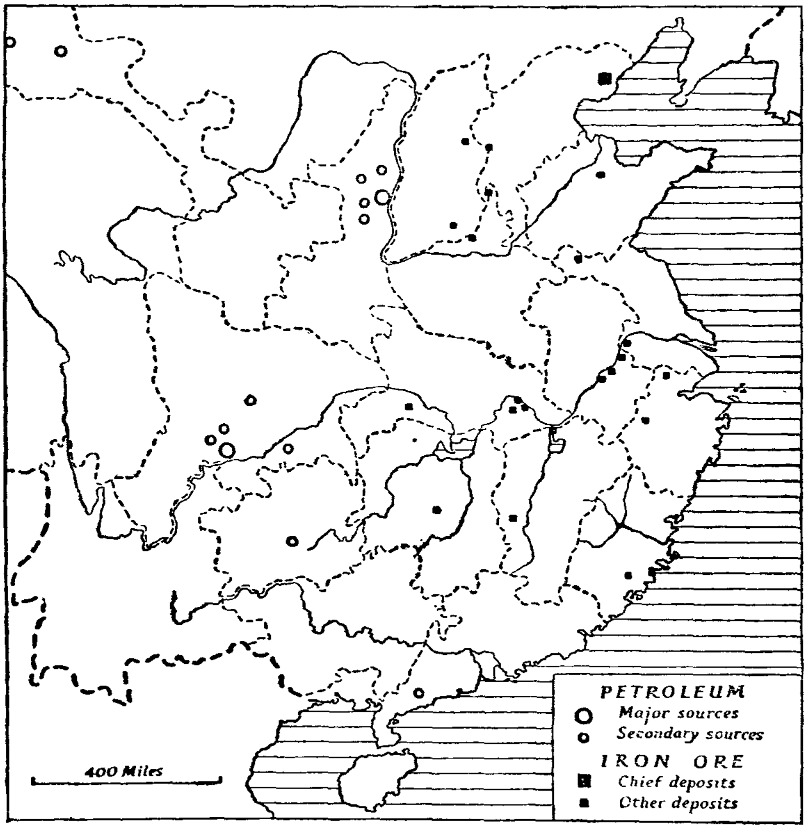

Fig. 28. Distribution of petroleum and iron ore

when detailed surveys came to be made by the Geological Survey. These reserves are now estimated at about 1,200,000,000 tons (including potential as well as actual reserves) out of a world total of

from 20,000,000,000 to 30,000,000,000 tons, which is a small proportion for so large a country. Moreover, of this amount, 1,200,000,000 tons, nearly three-quarters are in Manchuria.

The Chinese iron ores fall into distinct categories according to their mode of origin and value.

(1) Much the largest source is provided by the so-called 'Archaean' ores, which occur in a broad band extending from south Manchuria to north-eastern Hopeh and Chahar. The iron ore is abundant but poor in quality, containing not more than about 30 per cent. of iron and with more than 50 per cent. of silica.

(2) Far richer but limited in extent are the pre-Cambrian bedded haematite ores (known as Sinian), found particularly in the Hsuanlung district of north-western Hopeh, about 150 miles from Peiping. These are the equivalent of the rich iron ores of the Lake Superior region of North America, and are high-grade with an average iron content of from 48 per cent. to 56 per cent.

(3) The ores of the lower Yangtze valley (Hupeh and southern Anhwei) are the most valuable in China. They have been developed as a result of contact metamorphism in association with the igneous intrusions of the Jurassic period, and are very rich in iron. The estimated reserve of the Yangtze ores is rather over 100,000,000 tons, to which may be added another 30,000,000 to 40,000,000 in the South-Eastern Uplands, where ores of good quality have been discovered in Fukien.

In addition there are coal-measure ores of Permo-Carboniferous age in Shansi and elsewhere (Fig. 28). The apparent abundance of these greatly impressed the German geologist, F. von Richthofen, whose classical descriptions of China's mineral wealth first gave rise to a general impression of its magnitude. But detailed investigation has shown that most of the coal-measure ores are too thin to be workable on any large industrial scale.

China's reserves of iron ore are by no means negligible. If the Manchurian supply is included, they are probably the most considerable in the Far East, and are likely to be sufficient for China's own industrial needs for a long time to come. But when it is noted that the total estimated reserves are no more than the United States, on the average of recent years, actually consumes for iron and steel production in a single decade, it will be appreciated that there is little likelihood of China becoming a great metallurgical country.

Production. In actual fact production is not large, and the greater

part of the iron-ore supply has been under Japanese control for a long time. In 1936 the chief producing centres of iron ore were situated in the Yangtze valley and in Liaoning (Manchuria), and the total output was just over 2,000,000 tons. Of this amount nearly 1,000,000 tons came from Manchuria and about 800,000 from the Yangtze valley. The ores produced in Liaoning were exclusively for the supply of the Japanese plants at Anshan and Penchihu, where the raw material was turned into pig iron and steel.

Iron Ore Production (thousands of metric tons)

Mine	1932	1933	1934
Tayeh, Hupeh . .	382	366	382
Hsiangpishan, Hupeh.	135	73	70
Miaoerhkou } Liaoning	153	260	235
Anshan } Liaoning	888	916	950
Taochung } Anhwei	101	110	280
Paohsing } Anhwei	34	50	80
Fulimin } Anhwei	68	110	120
Changhua } Anhwei	65	..	..
Yihua } Anhwei	..	..	..
Yangchuan, Shansi	13	17	18
Total . . .	1,839	1,902	2,135

Source: Woodhead, H. G. W. (editor), *China Year Book* 1939, p. 471 (Shanghai, 1939).

In the Yangtze valley iron ores were worked in the Tayeh mine in Hupeh (Plate 36), operated by the Hanyehping Company, and at Hsiangpishan, near Tayeh, but operated by the provincial government. Here are located some of the best iron and manganese mines, and limestone and dolomite quarries, in the whole of China. In 1915 Japan got a controlling influence in the Hanyehping Company which was obliged to sell its ore to that country at very low contracted prices. The Tayeh mine originally had a reserve of about 26 million tons of high-grade ore, about half of which has now been worked out. The Hsiangpishan mine supplied the Liuhokou blast furnace at Hankow, and sold part of its production to Japan. In Anhwei the Yufan Company was also under Japanese influence, while in the Tangtu district several other iron mines such as Paohsing, Fulimin, and Yihua sold their ores to Japan. Prior to 1937 large-scale production was practically monopolized by Japan, only a very small

proportion being used locally. This is shown by the figures of the export of iron ore:

Iron Ore Exports (thousands of metric tons)

1932	1933	1934	1935	1936
551	584	858	1,316	1,306

Source: Woodhead, H. G. W. (editor), *China Year Book* 1939, p. 472 (Shanghai, 1939).

The capacity of the modern smelting industry in China was only theoretical because nearly all furnaces except those in Manchuria were closed. The Hanyehping Company owned four blast furnaces at Hanyang and two at Tayeh, but these, with a capacity of 1,560 tons of pig iron a day, remained idle after 1925. The Liuhokou iron works at Hankow and the Paochin iron works at Yangchuan were the only important furnaces producing in China Proper, but owing to high costs of production these were working intermittently and often suspended work altogether. One of the main difficulties encountered in the running of furnaces was the scarcity of coking coal within economic distances of the iron ore. About a ton of coke is required to smelt two tons of iron ore, and it was therefore essential that suitable coal should be available near the iron deposits. In this respect the Yangtze valley was badly situated, since all the coking coals, such as those from the Kaiping and Chunghsing mines, were too distant from the smelting centres. The Shihkiachwang coke, made from Chinghsing coal, was supplied at a reasonable price to the Yangchuan furnace in Shansi, but the latter, with a daily capacity of 20 tons, was not regularly operated. On the other hand, the Penchihu iron works and the Anshan iron and steel works in Manchuria had quickly increased iron production under energetic Japanese management in spite of the fact that the ores were of a comparatively low grade (Plate 35).

The steel-making industry was practically non-existent. The only plant carrying on regular operations in the making of steel on a commercial scale was the Hoshing steel works at Pootung, Shanghai. In addition, there were a few electric furnaces also in Shanghai, and small steel plants at Taiyuan in Shansi (Plate 37) and Chungking in Szechwan. The country was, therefore, largely dependent on foreign supplies, and imports of iron and steel amounted to 526,000

tons in 1933 and 618,000 in 1934. The metallurgical industries had been reduced to a deplorable condition, and yet the need for developing them was never so great. The construction of railways and bridges, the growth of industry, and the requirements of war economy had created a rapidly expanding demand for large quantities of iron and steel goods.

Gold and Silver

China has only small resources of gold and silver. Originally there must have been a considerable amount of alluvial gold, but it occurs in very limited quantities, and in China Proper is almost negligible. The chief sources of supply are in Manchuria, but Mongolia and Sinkiang have some potential importance. The gold which is produced is used mainly for ornamentation (Fig. 29).

In view of the fact that, next to India, China is the largest silver consumer in the world, it is surprising to find that she has never been an important silver producer. Small amounts are obtained as a by-product from the lead smelting works of Changsha, Hunan province; the ore (galena) comes mainly from the Shuikoushan mines in Changning, with 28–35 ounces of silver per ton of ore. Her large domestic requirements have been met by imports, though after the inflation of the price of silver she became an exporter of the metal, large quantities of which moved abroad.

Copper

Copper mining is probably the oldest metal industry in the country, but the reserves have largely been exhausted. The only two centres of production which are of any importance are situated in the south-west (Fig. 29). The first is at Tungchuan in north-eastern Yunnan, where the copper content of the ore is about 5 per cent. Tungchuan has been regarded for centuries as the greatest copper-producing region in China, and was the chief supplier of copper for coinage during the Manchu dynasty. Since 1911 there has been a general decline in production which in recent years has averaged between 400 and 500 tons. The second centre is in Penghsien in north-western Szechwan. The quality of the ore is reported to be inferior to that of Tungchuan, but the reserves are larger. China's total production did not meet the small requirements of domestic industry, which averaged 6,000 tons per year, and were covered by imports from abroad, chiefly the United States.

Plate 33. Tsiaotso mines, Honan

The Tsiaotso mines, operated by the Sino-British Chungfu Administration, produce mainly anthracite. A view of the power houses and Nos. 3 and 4 shafts of the Lifo colliery.

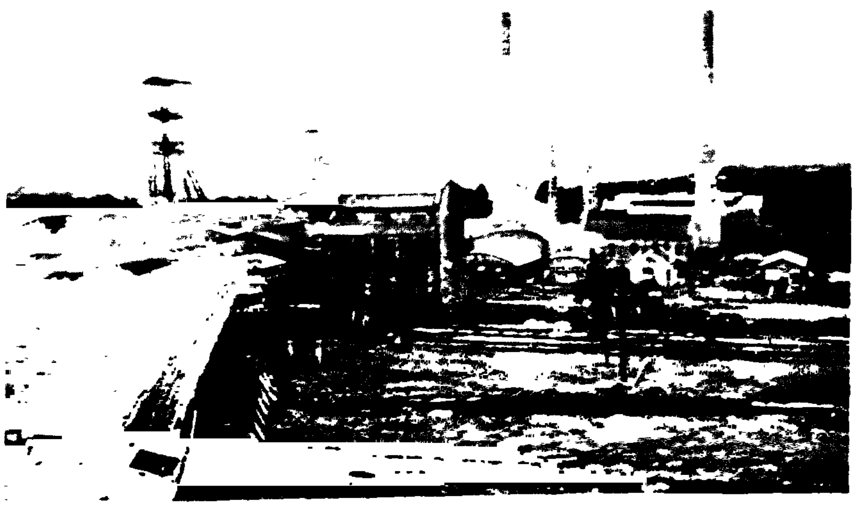

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Plate 35. Iron works, Hanyang
Part of the famous Hanyehping Iron and Steel Works at Hanyang

Plate 36. Blast furnaces, Tayeh, Hupeh
The Tayeh iron-ore deposits are the most valuable in China Proper.

Tin

The situation with regard to tin is a favourable one, and China ranks fifth among the world's producers (Fig. 30). There are two tin zones, the one extending from Hunan into Yunnan, and the other from Kwangtung through Kwangsi into French Indo-China (Fig. 29). Yunnan is again pre-eminent, and one district of that province, Kochiu, supplies 90 per cent. of China's total output. Cassiterite is obtained both from superficial residual deposits and rock ores, which are worked in numerous native mines. These are near Mengtsz on the Yunnan Railway, and thus favourably placed for export. Tin is also produced in Kwangsi (Hohsien, Fuchuan, Mantan, and Hochih districts), Hunan (Linwu and Kianghua districts), southern Kiangsi, western Kwangtung, and the island of Hainan, but the output is very small. The total production statistics for 1934 were as follows:

Tin Production (metric tons)

Yunnan	
Kochiu	6,941
Kwangsi	
Hochih, Fuchuan	315
Hunan	
Kianghua, Linwu	92
Kiangsi	
Tayu	600
Kwangtung	
Tienpo, etc.	50
Total	7,998

Source: Woodhead, H. G. W. (editor), *China Year Book* 1939, p. 474 (Shanghai, 1939).

With the exception of the mines of the Yunnan Consolidated Tin Corporation, a concern jointly owned by the National Resources Commission, the Yunnan provincial government and the Bank of China, most of the tin mines use handicraft methods. In Kochiu production of nine-tenths of the tin is further handicapped by inadequate supplies of charcoal and lack of water, which restricts operations to the rainy season from April to July (Plates 39, 40).

Exports of tin increased in the years before the Sino-Japanese war, and in 1936 exceeded 10,000 tons. The bulk of the ore was shipped to Hong Kong where it was further refined, and much of it was reimported for use in the manufacture of pewter, linings for

tea chests, and as an alloy in the making of bronze. In an attempt to avoid the loss in resmelting the metal at Hong Kong, a modern smelting plant was established at Kochiu in 1932 by the Yunnan Tin Corporation. This plant was subsequently enlarged, and in 1935 was reported to have a smelter production of about 2,000 tons.

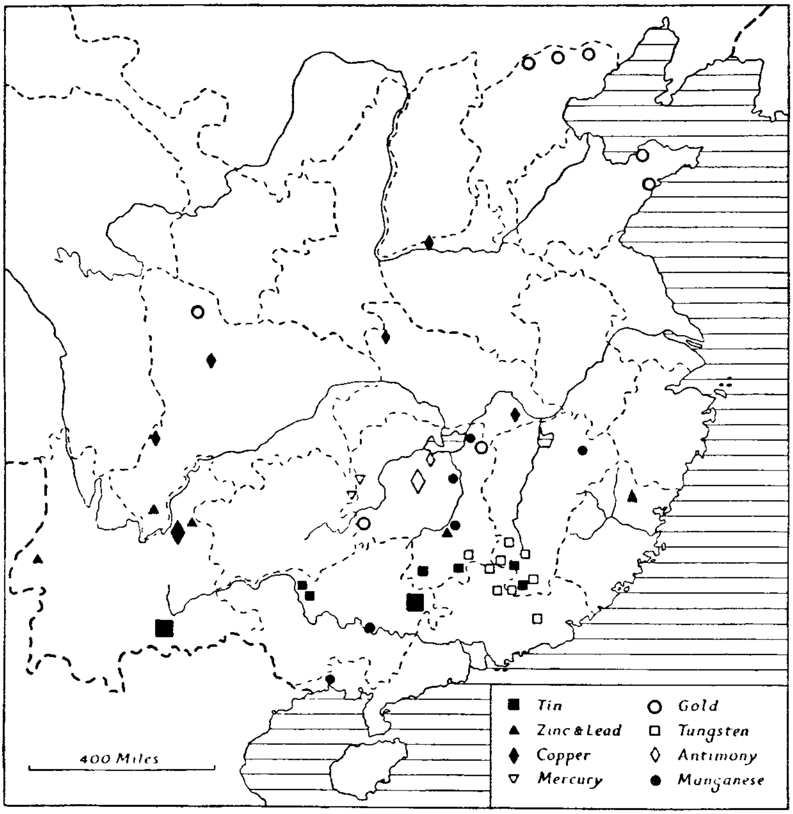

Fig. 29. Distribution of non-ferrous metals

In the case of tin, copper, and antimony the more important deposits are indicated by larger symbols.

Lead and Zinc

These minerals are commonly associated with each other. They occur together in the metalliferous regions of both North and South China, zinc tending to predominate in the south and lead in the north. The chief copper-lead-zinc zone extends from Hunan to Yunnan, but whereas in Yunnan copper becomes more important, Hunan is the chief source of lead and zinc (Fig. 29).

The largest mine in China is at Shuikoushan to the south-west of Changsha. In 1935 the lead ores (56–62 per cent. content) were mostly smelted by the Changsha lead-smelting plant, and the zinc (36–42 per cent. content) mainly by native methods at Sungpo, Changning district, but the total output was not large. The metallic zinc produced did not exceed a few hundred tons a year, while the lead production of the Changsha smelting plant was recorded at 2,475 tons (Plate 41). A high proportion of production was exported, mainly to Belgium, but was more than counterbalanced by imports. Lead and zinc are also produced in the Tungchuan district of Yunnan and in the Huili district of southern Szechwan, but they are unlikely to assume more than local importance.

Tungsten and Antimony

In the production of tungsten and antimony China enjoys a very favourable position. Both are rare metals whose importance has been greatly increased in recent years by the demands of a bellicose world for armament making. South China possesses unusually large supplies.

The chief tungsten zone is in the Nanling Belt and lies mainly in southern Kiangsi, bordering Hunan on the west and Kwangtung on the east (Fig. 29). The reserves are estimated at over a million tons, of which Kiangsi has about four-fifths. The production of this important ferro-alloy decreased from 9,000 tons in 1929 to 2,000 tons in 1932, owing to disturbed political conditions in the main centres and to the decline in world demand. There was subsequently a marked recovery and the Chinese output before the Sino-Japanese war, of about 7,000 tons per year, represented more than 40 per cent. of the world's total production (Fig. 30). The exports of tungsten were taken chiefly by Germany and the United States.

Antimony is China's most distinctive metal, and prior to the Sino-Japanese war she had something approaching a monopoly and supplied about 70 per cent. of the world's needs (Fig. 30). The estimated reserve is over three and a half million tons, and about 90 per cent. of production comes from Hsikuangshan, in Hunan, west of Changsha. There is a secondary centre at Panchi, also in Hunan, and small amounts are also obtained in Kwangtung, Kwangsi, and Yunnan (Fig. 29). Production reached its peak during the war of 1914–18, when exports averaged more than 30,000 tons a year. There was a falling-off to 10,000 tons in 1932, after which there was

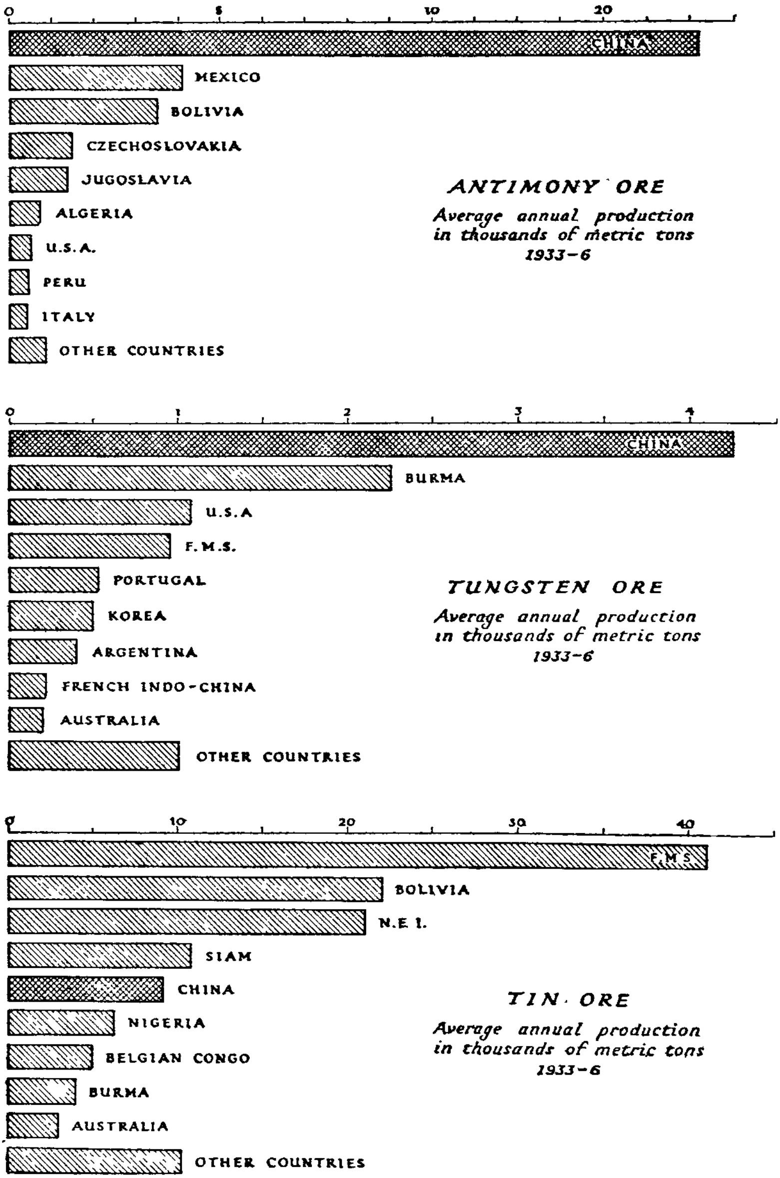

Fig. 30. World production of antimony, tungsten, and tin ores

Based on statistics in *Statistical Year-Book of the League of Nations*, 1938–39, pp. 154, 157–59 (Geneva, 1939).

some recovery. The metal has a very limited use in China, and its mining and smelting industry depended entirely on the export trade. In peace-time most of China's production is sold to the United States, the United Kingdom, and Japan, but since 1931 the Americans have been producing part of their own requirements, and other sources of supply have developed in Jugoslavia and Australia.

Manganese and Mercury

These complete the list of metals of which China is an important producer. Manganese ores occur in Hunan, Kwangtung, Kwangsi, and Kiangsi. The best ore is found in Hunan near Siangtan, and has an average metal content of 45 per cent., and reserves estimated at approximately 22 million tons. Most of the production is exported, and in 1936 there was a remarkable increase in world demand after an acute decline in the two previous years (Fig. 29).

Mercury has been known since ancient times in China, the chief use being for red ink and paint. The main producing centres are Tungjen, Shengki, and Pachai in Kweichow, and Fenghuang in Hunan, but in 1936 the combined output was no more than 30 tons per year.

Salt

For this commodity there is an enormous demand in China, and it has been a government monopoly from the earliest days of organized society. Only about 10 per cent., however, of an annual output of 3,000,000 tons comes from rock-salt deposits, chiefly from Yunnan and the salt brine wells of Szechwan. A certain amount is derived from salt lakes in Shansi, Tsinghai, and Sinkiang (Plate 44); in central Hupeh, north of the Yangtze, it is obtained as a by-product of gypsum mining. But incomparably the most important source of supply has been from remotest antiquity the sea salt of the coastal provinces. Practically all the maritime provinces have some share in it, but the zone of maximum production is the low-lying coastal plain extending from the southern margin of the Shantung hills to the mouth of the Yangtze. This belt, mainly in eastern Kiangsu (Plate 43), is about 200 miles in length and probably contains more salt evaporation pans than any other area in the world (Fig. 31).

It is significant, however, that with the Japanese occupation of the eastern seaboard, the rock-salt of the west has had its importance greatly enhanced. A large new centre, equipped with modern well-drilling machinery, has been developed at Tzeliutsing, the chief

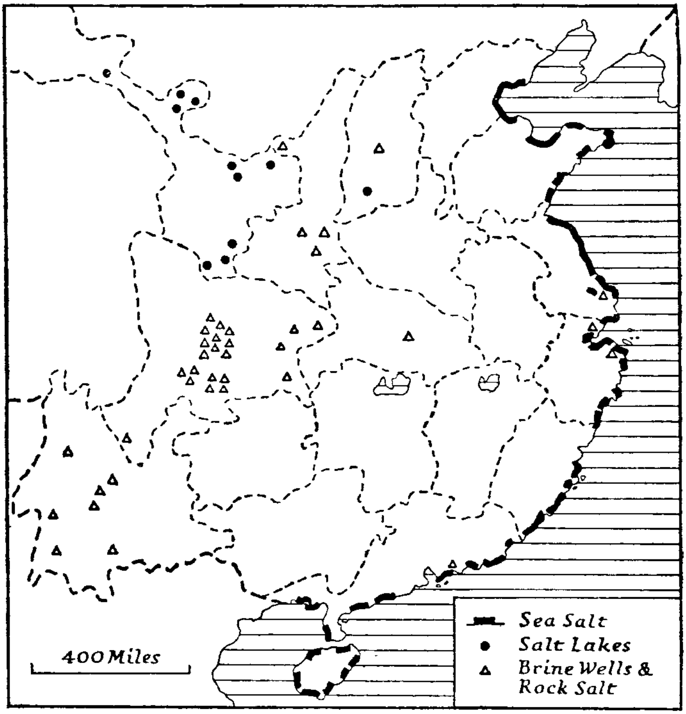

Fig. 31. Areas of salt production

Based on Spencer, J. E., 'Salt in China,' *Geographical Review*, vol. xxv, p. 356 (New York, 1935).

In the sea salt and salt lake areas the salt works are operated by solar evaporation and in the brine well and rock salt areas by boiling.

town of the Szechwan brine district (Plate 42). This is one of the many new developments in western China for which the Japanese invasion is responsible.

Gypsum and Alum

Gypsum deposits occur in a number of places in China, but most of the country's supply has long been derived from mines in the Yincheng district in central eastern Hupeh, some distance north-west of Hankow. The Yincheng mines, which were started as long ago as the Ming dynasty, produce between 50,000 and 60,000 tons a year. Siangtan in Hunan comes second with 13,000 tons, and Pinglu in southern Shansi third, with an output of 2,500 tons. In 1936 the rate of production did not meet the demand, and about 40,000 tons came from abroad, chiefly in the form of building materials.

Alum is worked in the boundary districts between Chekiang and Fukien. Pingyang, in southern Chekiang, produces about 10,000 tons per year, and is followed by Futing in Fukien, and Lukiang in Anhwei, which produce about 2,000 tons each. In the years before the Sino-Japanese war the annual consumption of alum amounted to about 10,000 tons, and the surplus was exported to India, the Straits Settlements, and French Indo-China.

Clay

Fire clay and porcelain clay are worked in many provinces of China. By far the most important is Kiangsi province, seat of the historic Kingtechen industry, where approximately 150,000 tons of porcelain clay are produced from Fouliang, Singtzu, and Yukan districts. Hopeh produces about 190,000 tons of fire clay and clay for pottery, while large amounts are also worked in the Poshan and Tzuchuan districts of Shantung, and in the Ihing district of Kiangsu. The total production for the whole of China is estimated at 1,000,000 tons.

Sulphur

No important deposits of native sulphur have been found in China, but there is a small production from pyrites in the coal seams in Honan and Shansi, or those associated with lead and zinc ore, as in Hunan. Peace-time production averaged only 4,000 tons per annum, and several thousands of tons were imported every year from Japan.

War-time Developments, 1937–44

The outbreak of the Sino-Japanese war severely dislocated China's mineral industry. Many rich mines in the north-western provinces and the coastal districts were destroyed, whilst others were taken over by the enemy. These losses were partly offset by opening up new mines in the interior and by working old ones more intensively. In certain cases machinery in the war zone was dismantled and successfully reassembled in safe areas. Several coal mines, among them the Chungfu Administration of Honan province, had their original plants transported in this way. Their hoisting, pumping, and other equipment were mostly used for the operation of coal mines in the south-west.

The development of new mines is preceded by investigations by the National Geological Survey, the Geological Institute of *Academia Sinica*, and the National Resources Commission. The purpose of this survey work is to provide a basis for the systematic development of China's resources, particularly those which will strengthen the country's war economy. In 1941 units were sent out to make investigations in the provinces of Hunan, Kweichow, Shensi, Kansu, Sikang, Yunnan, and Szechwan ; special attention has been given to prospecting for oil, copper, iron, lead, and nickel. These surveying units have been instrumental in discovering new coal, oil, and iron deposits in Kansu, coal seams and aluminium deposits in Yunnan, and iron and sulphur veins in western Hupeh.

The increase in the number of mining concessions operated by the Government and private interests is also indicative of the importance attached to the founding of a base for heavy industry in the interior. Between 1939 and 1941 the Ministry of Economic Affairs granted 131 mining concessions to the Government, and 1,432 to private interests. Furthermore, under the revised Mining Law of 1938, such minerals as iron, mineral oil, coal deposits, tungsten, and antimony can be designated as national reserves and private exploitation of the mines be forbidden. From October 1941 to August 1942, 31 national reserves were established, including 4 iron reserves in Szechwan, 1 iron reserve in Yunnan, and 11 tungsten reserves in Hunan.

Power Resources

Coal. Most of the coal-producing centres were lost to the Japanese in the early years of the war, and further exploitation of them by the Chinese is out of the question until hostilities cease. Attention has, therefore, been focused on reserves in the west and north-west beyond the reach of the invaders, and said to be large enough to support a moderate programme of industrial development. According to recent reports these reserves are estimated at approximately 90,000,000 tons with the main concentrations in Shensi (70,000,000), Szechwan (9,000,000), and Sinkiang (6,000,000).

Many coal mines are being organized and operated by the Government though no statistics of production are available. The National Resources Commission alone operates altogether 19 coal mines scattered in Szechwan, Yunnan, Hunan, Kweichow, Kansu, Shensi, Sikang, Kwangsi, and Kwangtung. Two of the coal mines in Szechwan, one in Yunnan and one in Kweichow, are producing either

metallurgical coke or semi-coke for industrial or household purposes. There has also been a steady increase in the production of private mines, which in 1942 produced 4,933,000 tons. In that year the total production for the whole of 'Free China' was 6,000,000 tons according to the Department of Mining of the Ministry of Economic Affairs.

Petroleum. The serious shortage of liquid fuel resulting from the present war has greatly stimulated government interest in the exploitation of petroleum resources in the provinces of the interior. Seepages have been reported in western Kansu for a great many years, mainly in the vicinity of well-worn routes, and their special occurrence would seem to be in the northern foothills of the Nan shan around Yungchang, Suchow, Yumen, and Tunhuang. Parts of the area were surveyed and prospected between 1934 and 1937, and drilling commenced in 1938 on a structure near Yumen. Already 14 or 15 wells are believed to have been completed as producers, and at least 3 are said to yield oil in considerable quantities. It is estimated that production for 1941 was around 70,000 barrels of gasoline, and it was hoped that this figure would be increased to 300,000 barrels by 1944. The possibilities of this field are a closely guarded secret, but it is claimed that it has a rich reserve relative to other Chinese sources, and that large-scale production is possible.

Investigation is being pushed on in Sinkiang and Sikang. Little is known of the reserves in Sinkiang, but seepages have been reported from the districts of Urumtsi, Kuchu, Siulai, and Tacheng. In October 1942 the Chinese government was about to plan the large-scale development of a new oilfield which had been discovered in 1935. This probably refers to the Wusu region, where small amounts have been produced at a location roughly where the Chinese-Soviet Highway forks to link up with the Turksib railway at Sergiopol and Alma-Ata. In Sikang the Ningtsinshan reserve is reputed to be one of the largest in China.

These developments, although of significance for China's long-term industrial development, cannot achieve results sufficient to meet the pressing requirements of modern war. Prior to 1937 China was largely dependent on foreign countries for kerosine and motor fuel, but since the occupation of French Indo-China and the outbreak of the Pacific war all the vital supply routes have been cut. Reserves which had been built up during the early years of the war have also been exhausted. By the autumn of 1944 the situation had become critical, and it was feared that, unless an effective substitute

could be found, the whole internal system of transport might break down.

Petroleum Substitutes. Thus far no effective substitute has been discovered. Many have been tried; some have given good results in tests, but they have all developed limiting factors when tried out on a national scale. Alcohol is the best, and in April 1943 there were over 130 small distilleries using wood, molasses, grain, etc., as their raw materials in areas where surplus supplies were available. The National Resources Commission was said to be operating 10 alcohol plants: five in Szechwan, and one each in Yunnan, Kweichow, Kansu, Shensi, and Sinkiang. The capacity of these 10 plants has been stated to exceed 3,000,000 gallons annually, but other sources report that owing to the urgent need for foodstuff the country's total alcohol production to-day does not exceed 30,000 tons.

Charcoal gas-producers have been tried, but China is not a wooded country, and most of the centres where charcoal can be made on a large scale lie away from the main lines of communication. Moreover charcoal gas-producers lack the power to climb steep hills, and it has been found that the strain put on engines of this kind wears them out after about 3,000 miles. Natural gas, which is available in considerable quantities, can only be used on a small scale owing to the lack of the large cylinder containers that it requires.

The Government has also set up the Vegetable Oil Cracking Plant, which produces gasoline, kerosine, and fuel oil by cracking vegetable oil. Processes yielding 33 per cent. of synthetic gasoline from tung-oil have been discovered, and attempts are being made to raise this percentage. While these experiments may prove of great value in post-war reconstruction, they are extremely slow and expensive, and have not gone far to alleviate the present serious position.

Mineral Resources

Iron. On the eve of the war China's iron and steel industry was very poorly developed, but since 1937 great efforts have been made to increase the output of these vital materials. Recent exploration and survey in the western provinces have brought to light new resources of iron ore. Szechwan is now believed to have far larger reserves than was formerly supposed, the most important deposit being in Chikiang in the south-eastern part of the province. Potentially of the greatest importance are the discoveries in the province of Sikang, where the Luku deposit is said to contain about 100,000,000 tons of high-grade ore (65 per cent. metallic content). Sinkiang,

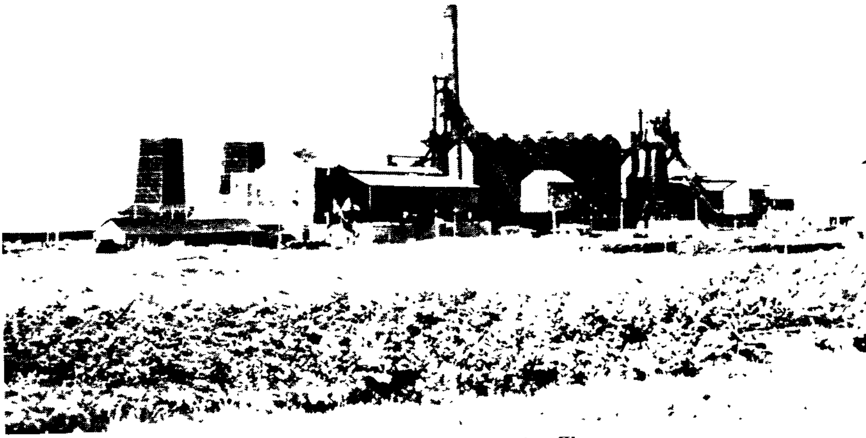

Plate 37. Taigen steel works, Taiyuan
This small plant has undergone further development under Japanese occupation.

Plate 38. Iron smelting, Pingtingchow, Shansi
The smelting and working of iron on a small scale has long been carried on in many parts of China.

Plate 39. Washing tin ore, Kochiu, Yunnan

Kochiu is by far the most important tin-mining district ; the ore is extracted mainly by primitive methods.

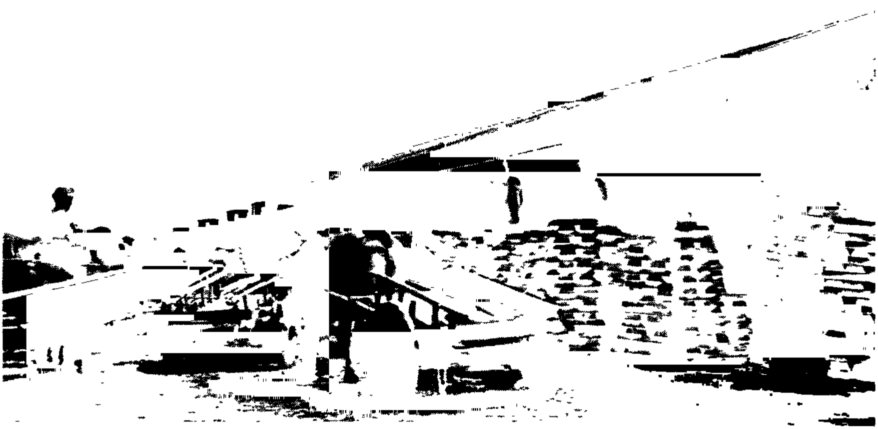

Plate 40. Loading tin slabs at Pishihtsai, Yunnan

Pishihtsai, on the Yunnan Railway, is linked with Kochiu by a narrow-gauge line (see p. 494).

Kansu, and Yunnan are reported to have considerable reserves, although the amounts have not yet been ascertained. The deposits of Szechwan and Sikang, however, are sufficient to support a moderate development of the iron and steel industry in the south-west.

In spite of attempts to increase the domestic production of iron ore and to encourage purchases from abroad, the position had become very serious by 1939, when the supply did not cover even the most urgent requirements. Accordingly in January 1940 the Ministry of Economic Affairs announced the nationalization of iron and steel. An Iron and Steel Control Commission was established in an effort to help China to attain self-sufficiency in the two metals, and steps were taken to stimulate the import trade. Customs and transport facilities were given to incoming shipments, and laws were passed to prevent smuggling and trading with the enemy. Hoarding and profiteering were prohibited, and all transactions and movements of metals were registered by the Control Commission.

It is difficult to ascertain the present position because reports are sketchy and conflicting. All of them indicate that the output of pig iron from modern blast furnaces is increasing as initial handicaps are being gradually overcome. After the outbreak of war China lost practically all of the few blast furnaces she possessed, but by dint of hard work 12 new furnaces have been set up in the interior, most of them working at full capacity to meet military and industrial needs. Several of these furnaces are using machinery removed from iron and steel works in vulnerable places. The essential parts of the Hanyang ironworks in Hupeh, weighing about 40,000 tons, were removed to Szechwan and reinstalled in Chungking. It is now producing pig iron, iron castings, and steel for the use of arsenals. The total production of these modern plants was estimated at 15,000 tons of pig iron in 1940.

The Government attached considerable importance to native iron production, and created a native iron control bureau in 1940. The latter organizes the collection of native ore and allocates the iron output of local furnaces between military and industrial uses. In 1940, 300,000 tons of iron ore were produced by native mines in the interior provinces. This yielded about 100,000 tons of pig iron, of which approximately one-third came from Szechwan and the remainder from Shensi, Yunnan, and Hunan.

The steel industry is still in the early stages of development, but some progress has been made. The National Resources Commission has set up two steel-making plants, one in Chungking and the other

in Kunming, and has also under construction a special iron-smelting plant producing pure iron by the direct treatment of ore. The product, known as sponge iron, may be resmelted and converted into high-grade steel to meet the requirements of war industries. No statistics of production are available, though it has been stated that the output of steel by government-owned steel works in the first half of 1942 was three times the entire 1941 figure.

Non-ferrous Metals. Most of the non-ferrous metal workings were nationalized when war broke out in 1937, and their administration was entrusted to the National Resources Commission. The latter has established four independent offices for the control and export of tungsten, antimony, tin, and mercury respectively. These minerals have formed an important part of China's export trade, and have been used to pay for war materials and foreign loans. Their export has been reduced since the Burma Road was cut, but China has continued to sent minerals to America by air transport, and to the Soviet Union partly via India and partly via Sinkiang.

Statistics released by the Ministry of Economic Affairs show that, with 1940 as the base period, the index figures of the production of mercury were 131 in 1941, and 200 in 1942, and of tungsten 130 in 1941, and 139 in 1942. An official estimate of the world output of tungsten in 1942 is as follows:

Estimated World Production of Tungsten Ore, 1942 (*thousands of metric tons*)

China	6·36
U.S.A.	4·10
Bolivia	2·67
Portugal	2·38
Burma	1·47
Korea	1·20
Argentina	1·01
Other countries	4·26
Total	23·45

The index figures of antimony, however, were reduced to 88 in 1941, and to 86 in 1942. The Government began to bring tin under state control in 1939, and purchased a large amount in the following year. The production of tin in 1940 was, therefore, abnormally high; it was greatly reduced in 1941 and 1942, the index figures being 42 and 52 respectively.

The export of mineral products suffered serious declines following

the outbreak of the Pacific war in December 1941. With 1940 as the base period, the index numbers of the export of tungsten were 190 in 1941, but were reduced to 97 in 1942; those of tin were 106 in 1941, but they slumped to 75 in 1942, while those of antimony were only 14 in 1941 and 2 in 1942.

Since the outbreak of war magnesium and aluminium have rapidly become metals of vital importance. Among the raw materials from which these metals are extracted magnesite and bauxite are the most important. China has the largest magnesite reserves in the world, but these are located in Liaoning, and were undeveloped until the Japanese began to exploit them after the occupation of Manchuria. The most important bauxite deposits are also in Liaoning, but there are considerable reserves in Shantung, Kansu, and Yunnan, the latter of which are being developed by the National Government. In addition to the production of metallic magnesium and aluminium, magnesite and bauxite are used for making firebrick, flux, and magnesium and aluminium salts. The development of these deposits should, therefore, prove very valuable to post-war China.

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2. Specific minerals are dealt with in the following: Smith, W., *A Geographical Study of Coal and Iron in China* (London, 1926); Tegengren, F. R., 'The Iron Ores and Iron Industry of China,' *Memoir of the Geological Survey of China*, 2 vols. (Peking, 1921–24); Spenser, J. E., 'Salt in China,' *Geographical Review*, vol. xxv, pp. 353–66 (New York, 1935); Lee, T. S., 'Coal Resources of China,' *Asiatic Review*, vol. xxi, pp. 571–85 (London, 1935); 'China's Coal Production and Trade,' *Chinese Economic Journal and Bulletin*, vol. xx, pp. 379–97 (Shanghai, 1937); Spenser, J. E., 'Gypsum and Salt Mining in Central Hupeh, China,' *Economic Geography*, vol. xiv, pp. 282–86 (Worcester, Mass., 1936); Read, T. T., 'Economic-Geographic Aspects of China's Iron Industry,' *Geographical Review*, vol. xxxiii, pp. 42–55 (New York, 1943); and Li, K. C., and Wang, C. Y., *Tungsten*, pp. 20–47 (New York, 1943).

3. Much statistical material in addition to general surveys are available in: Woodhead, H. G. W. (editor), *China Year Book* (annually, Shanghai); Wong, W. H.,

'Mining and Metallurgical Industry,' *The Chinese Year Book* 1936–1937, pp. 1366–74 (Shanghai, 1936); Chin, F., 'War Economy: III. Mining,' *Chinese Year Book* 1940–1941, pp. 563–72 (Chungking, 1940); and Chinese Ministry of Information, *Chinese Handbook* 1937–1943, pp. 477–93 (New York, 1943). The two latter deal largely with war-time aspects.

4. On electric power the following may be consulted: 'Water Power Resources of China,' pp. 93–96, and 'Electric Power Development in China,' pp. 105–30, *Transactions Third World Power Conference*, vol. ii (Washington, 1938); and Chin, F., 'Electric Utilities,' *Chinese Year Book* 1940–1941, pp. 580–82 (Chungking, 1940).

Chapter IV

INDUSTRY

Conditions up to 1937: The Traditional Industries; Factors affecting Modern Industrial Development; Industrial Evolution; Industrial Regions; Principal Industries.

War-time Developments, 1937–44: Industrial Policy; The Transfer of Industry; State-owned Industry; Private Industry; Provincial Development Corporations; New Industrial Regions; The Industrial Co-operative Movement; The Industrial Outlook.

Bibliographical Note.

CONDITIONS UP TO 1937

THE TRADITIONAL INDUSTRIES

Before discussing the factors which have facilitated or retarded the process of modern industrialization, it is necessary to survey the development of native industry. Prior to the nineteenth century China had achieved a highly organized social and economic system; and self contained and self-sufficient, her rulers desired no contact with the western nations. The well-known reply of the emperor Ch'ien Lung to Lord Macartney's request for trading facilities in 1793 throws light on the prevailing conditions: "As your Ambassador can see for himself, we possess all things. I set no value on objects strange or ingenious, and have no use for your country's manufactures." This reply had more economic justification than the British were willing to admit. China had long possessed important industries which provided most of her basic needs. The technique and organization were characterized by the prevalence of craftsmen and merchant-employers, using little capital and labour. The independent handicraftsmen, with their patience and dexterity and their unusual gift for producing goods of high quality, were an important economic factor for centuries. When Marco Polo visited Hangchow in the thirteenth century he recorded that there were some 12,000 workshops in that city with twelve to forty workers each. The products of these craftsmen included porcelain, jade, lacquer, woodwork, and silk, in all of which were embodied the skill and experience of centuries. Chinese silks have been renowned since classical times, and were in great demand among European

merchants. The knowledge of cotton growing and spinning spread into the country in the eighth century, and the new fabric was admirably suited for the clothing of the peasant population. The cotton cloth, known as nankeen, was finer than that produced by western looms. The production of pottery and porcelain has also a long and renowned history. Kingtechen was very famous for its porcelain, and examples of its pottery are still kept in the museums. Closely related to the potters' art was that of tile-making and glazing, and the Imperial kilns were established south-west of Peiping

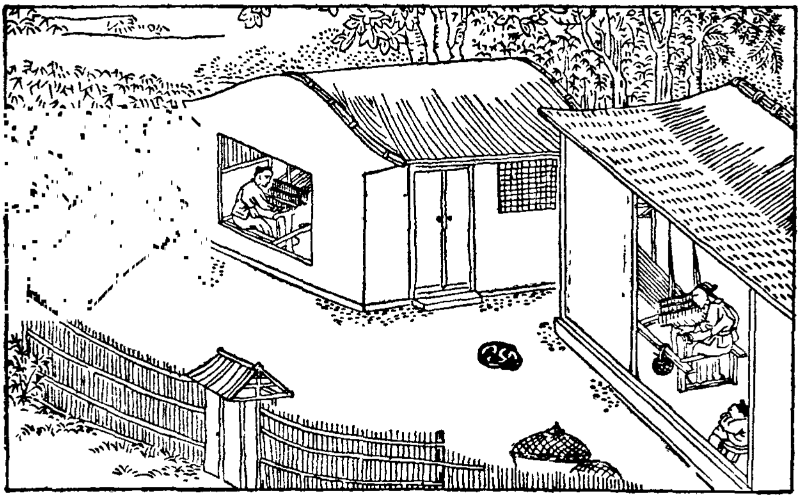

Fig. 32. Weaving

Based on a reproduction of a Chinese engraving in Sion, J., *Géographie Universelle*, tome ix (*Asie des Moussons*), première partie, p. 163 (Paris, 1928).

(Peking) to produce roofing and decorative tiles for the palaces. The smelting and working of metals also goes far back in Chinese history (Plate 38).

Away from the towns the handicrafts of the peasant families have always been important, and during periods of enforced winter leisure the men do carpentry and masonry and the women spin and sew. These handicrafts, based on home labour and the use of local raw material, represent a traditional and primitive form of production, the very simplicity of which has been a deterrent to technical improvement (Fig. 32).

But towards the end of the nineteenth century China's long period of economic isolation was drawing to its close, and the Treaty

of Nanking (1842) had opened the gates of the Celestial Empire to trade and commerce. In spite of this, native industry persisted, small in scale and domestic in character, and the development of modern industry was left mainly to the initiative of the western Powers.

Factors affecting Modern Industrial Development

China enjoys adequate bases for industrial development in her mineral and agricultural resources and in her unlimited supply of labour, which has a long tradition of craftsmanship. On the other hand she has been deficient in capital, in trained technicians, and in organizing skill, all of which have been largely supplied from outside. Accordingly, the enterprise and initiative of foreign powers has been a factor of the greatest importance in the establishment and continued operation of manufacturing industries in China.

The Physical Environment

Mineral Wealth. The leading mineral resources needed for industrialization are coal, iron, petroleum, and copper. Coal, petroleum, and copper are essential for the generation and transmission of motive power, while iron supplies the basic mineral for machine civilization. As was shown in the broad review of mineral wealth (see pp. 84–105) China has moderate reserves of coking coal, limited supplies of iron-ore, and insignificant resources of petroleum and copper. These deficiencies necessarily limit the scope of industrial development. All the great industrial regions of the world such as the Ruhr-Lorraine complex, eastern North America, and Great Britain have as their basis large supplies of power and iron-ore. China does not possess these advantages to an equal extent, and the growth of a metallurgical industry of similar dimensions seems unlikely.

Agricultural Wealth. Although a large proportion of the land has been reserved for food production, cash crops (among them cotton, tea, and tobacco) have increased in importance, and as greater agricultural specialization becomes possible, they will act more and more as feeders of secondary industry. The greatest handicap has been the sporadic, uncertain, and unorganized nature of production. Raw materials—for example, cotton and wool—have often reached the markets in a most unsatisfactory condition, and there has been an urgent need for grading or standardization. Moreover, agriculture has been out of touch with the requirements of industry, and greater

co-ordination between the two branches of production was necessary. It is only in recent years, since the Government has embarked upon a policy of economic control, that administrative apparatus has come into existence which may permit the co-ordination of agricultural with industrial development.

The Human Environment

Labour. The initial advantage which China possessed in the patience and industry of her workers was partially offset by the general social environment centred on the family system. The latter retains an economic significance which bears directly upon the question of industrialization. The family tie is extremely strong in China, and has tended to limit the development of individuality and initiative. People marry young, and are tied down with domestic responsibilities at an early age. The stability of the family unit is thus given a firm foundation, and the spirit of adventure which is so indispensible in a modern capitalistic society is absent. It is noticeable, however, that the Chinese who have gone to British Malaya and the Netherlands East Indies are more enterprising and show greater initiative. Whilst the family system has had certain beneficial results it has tended to encourage economic dependence or ' family communism,' under which the more successful members have been expected to help to support directly or indirectly the less fortunate. This has had many social advantages, but is liable to abuse, and has tended to discourage originality and individual experiment.

The long tradition of craftsmanship is a favourable factor for industrialization, though it may not be easily adapted to the modern factory technique. China has the advantage of abundant and skilful labour, and in the future may be able to meet the requirements of consumers for variety and quality in an era of mass production and uniformity. On the other hand, it has often been contended that the handicraftsman has shown no particular aptitude for factory work, and an astute English economic expert has remarked on "the curious contrast between the slovenliness of Chinese workmanship on western patterns—windows that will not open and doors that will not shut—and the admirable fitness and precision of the wares which it makes by methods native to its genius to meet the needs of common life." [1]

The problem of labour supply has existed for many years. The

[1] Tawney, R. H., *Land and Labour in China*, p.114 (London, 1931).

Plate 41. Lead and antimony smelting plant, Changsha
Important resources of lead and antimony near Changsha provide the ores for this works.

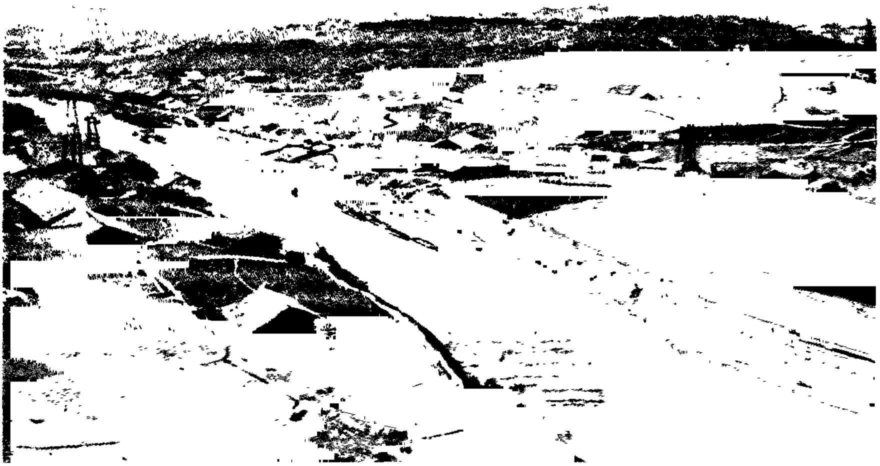

Plate 42. Brine wells, Tzeliutsing, Szechwan
Tzeliutsing is the chief centre of the Szechwan brine district (see also vol. i, Plate 41).

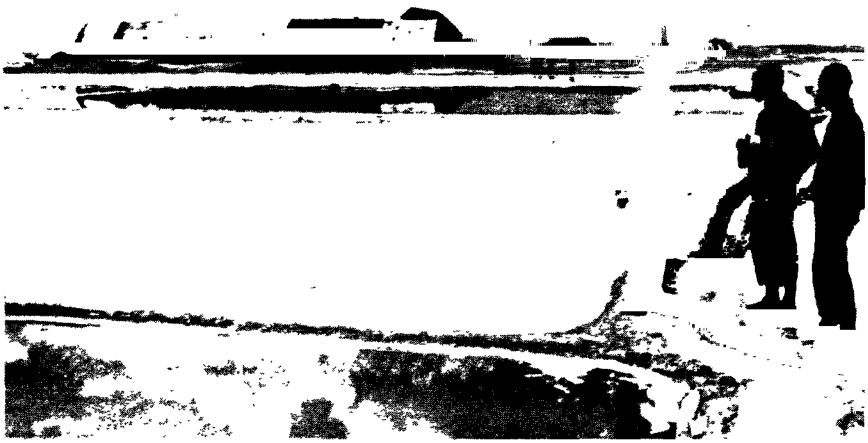

Plate 43. Salt pan, eastern Kiangsu
A view of a salt pan with the dry salt ready for raking.

Plate 44. Yuncheng salt lake, southern Shansi

Chinese worker, primarily an agriculturalist, does not possess the skill required for the operation of complicated machines and instruments purchased from abroad. Moreover, accustomed as he is to the traditions of guild or domestic industries, he lacks the discipline which is the inevitable accompaniment of the factory system. The ports—for example, Canton and Shanghai—where modern industry first developed were faced with this difficulty and took several decades to build up an adequate labour reserve, which other centres came to regard as a source of supply. Millowners in Tientsin and Tsingtao in North China, who recruited factory labour from these cities in the south, induced workers to move from one factory to another by offering travel, dormitory, and other facilities. The increase in skilled personnel was, however, slow, and on the eve of the Sino-Japanese war the number of industrial workers in the whole of the country did not exceed two millions. Since 1937 many of these have migrated to industrial centres in the interior, and they provide a nucleus through which a new army of industrial labour is being trained. The number immediately available for factory employment is inevitably small, and the problem of skilled labour, in spite of recent developments, remains a factor limiting industrial development.

Capital. One of the prerequisites of industrialization is the possession of capital, but China's resources in this respect have been extremely meagre. In the countries of the west, particularly England, a remarkable expansion in foreign trade from the sixteenth century onwards resulted in an accumulation of capital which formed a sound basis for industrial development. In China foreign trade was negligible when compared with her enormous population, and any capital which was available was invested in land and became immobile. The lack of capital was also partly a consequence of the family custom of equal inheritance among the dependants, which brings about the more even distribution of wealth and prevents the accumulation of the large aggregations of capital which characterized the growth of industry in the west. The joint-stock system, with its immense possibilities for the exploitation of economic resources, was not easily adapted to this social environment. In consequence, there has always been an urgent need for capital, not only for industry but for agriculture, for transport and communications, for mines and power, and for all the exacting requirements of the present time. Taking the country as a whole there has never been any net annual surplus of real income, and at present it can

provide only a very small proportion of the capital necessary for modernization. The alternatives have been either to limit economic reconstruction or to borrow from abroad.

Managerial Personnel. Scarcity of managerial capacity has been no less urgent than the lack of capital. In England the early managers of factories were often successful merchants engaged in foreign trade, but in China this class was not numerous, and where large fortunes were made, as in Canton, they were usually spent on the acquisition of land. In the early years of modern industrialization, key managerial positions were therefore filled by Europeans, while less important ones were occupied by petty Chinese bureaucrats who had no real business ability. In the course of time some of these bureaucrats accumulated wealth, left the factories, and organized new enterprises of their own. Meanwhile foreign-controlled concerns continued to employ Chinese assistants because of the language difficulty. These assistants, commonly known as *compradores*, also acquired knowledge and experience of factory organization from their foreign superiors. It was from these three groups, namely, foreigners, bureaucrats, and *compradores*, that managers for early Chinese industrial ventures were recruited.

Later on other sources of supply were added. Overseas Chinese who had made their fortunes in foreign countries returned home and established new industrial undertakings of their own. As the need for trained personnel became more pressing the Chinese government, at first at its own expense, but after 1908 through Boxer Indemnity Funds returned by the United States and later by Great Britain and other countries, began to send its students abroad for advanced studies in the sciences. Just before the present war the Nanking government, under the auspices of the League of Nations, availed itself of the services of various technical experts in state enterprises engaged in the production of minerals, iron and steel, machinery, and electrical apparatus. But in recent years the most important source has been the Chinese colleges and universities, which have trained considerable numbers of graduates for active industrial service.

The Foreign Powers

As a result of the considerations outlined above, industrialization did not come spontaneously and as the outcome of economic evolution, but was due primarily to foreign enterprise and initiative. In the nineteenth century the Great Powers, increasing their pressure upon

China, succeeded in obtaining a number of trading concessions. From the time of the Treaties of Nanking (1842) and Tientsin (1858) China lost her right to determine import and export tariff rates except by agreement with the Treaty Powers. Then, after the conclusion of the Treaty of Shimonoseki with Japan in 1895, Japan obtained the right to erect factories in the treaty ports and open cities, and this concession, through the operation of 'the most favoured nation' clause, has passed on to other nations.

The foreign concerns which were soon set up enjoyed superior advantages over the Chinese. They had stronger financial backing, easier access to shipping facilities, and relative freedom from illegal exactions by local and provincial war-lords. Early industry was, therefore, largely a foreign creation dependent upon western capital for its growth. The dominant role played by western capital continued to be the outstanding characteristic of China's industrial structure right up to the outbreak of the Sino-Japanese war. In 1937, for example, foreign-controlled mines supplied about half of China's total production of coal. Most of the iron mines were controlled by the Japanese, and practically the entire output was exported to Japan. Foreign interests were also conspicuous in the cotton industry and in shipping. and supplied a substantial share of the capital in tobacco factories, oil mills, and other important enterprises. A large proportion of the external trade of the country was in the hands of foreign merchants, while railway construction had been almost entirely financed by foreign capitalists. A well-known Chinese authority gives the position before the outbreak of the present war:

"To-day, after a period of eight years, modern industrial capital amounts to only 3,808 million dollars (pre-war value, approximately equivalent to 1·3 billion United States currency), which, estimated on the basis of a population of 450 millions, gives a *per capita* share of less than nine dollars. It must also be noted that small as the total industrial capital is, the share for domestic capital reaches only 987 million dollars or 26 per cent.; the rest, 2,821 million dollars, or 74 per cent., being foreign capital invested in China." [1]

The rise and development of modern industry have, therefore, been fortuitous and haphazard compared with many countries, particularly Japan, and have not been subjected to co-ordinated control. To some extent it was undoubtedly manipulated to meet

[1] Fong, H. D., 'The Prospects for China's Industrialization,' *Pacific Affairs*, vol. xv, p. 45 (New York, 1942).

the requirements of external commerce, and became concentrated in the treaty ports, and up the Yangtze river at points accessible to steam navigation. Within these favoured areas the Powers combined foreign administrative ability and capital with cheap labour to build up strong secondary industries. They also derived benefits from the influx of Chinese population and wealth seeking security from the political anarchy which prevailed over the rest of the country. The total effect was that the spirit of western industrialism was transplanted to the eastern seaboard, and in just over one generation 'a modern fringe was stitched along the hem of the ancient garment' of Chinese civilization.

Industrial Evolution

Modern industry in China has gone through certain definite phases of evolution. Prior to the establishment of the National Government (1928) its growth was strictly limited, and, with the exception of Hankow, the whole of the great hinterland remained practically untouched by modern influences. The setting up of a strong central authority in 1928 permitted the Chinese to pursue a more rigorous policy, and the Government itself began to stimulate and regulate industrial activity. Since 1937 this tendency has accelerated, as the need to build up strong national defence industries has become more urgent. There has been an intensive development of Government enterprise, and a large amount of state control and guidance of private business.

Modern Industry, 1890–1928

Before 1890 large-scale industry did not really exist in China, with the exception of two or three power-driven factories which had been constructed by the Chinese. Of these the cotton weaving mill set up in Shanghai by Li Hung-chang was perhaps the most noteworthy. After 1895 industry developed steadily, and the first foreign-owned mills to be established under the Treaty of Shimonoseki were started in Shanghai by British, German, and American interests. Although the foreign element predominated during these early years, industrial activity had a dual aspect—western and Chinese factories existed side by side. Native-owned concerns began to develop first in the cotton industry, and then both Chinese and foreign capital branched out into new fields such as flour and oil milling, the manufacture of soap, candles, glass, matches, and cigarettes, and other

light industries. Many Chinese capitalists, however, were too weak financially and too inexperienced to hold their own with the strongly organized foreign concerns, and were compelled to act as *compradores* or middlemen. The pace of industrialization remained very slow and even in 1910, so far as is known, there were only 4,500 miles of railway, 26 cotton mills, and 31 modern flour mills in the whole of the country.

The war of 1914–18, by cutting off foreign supplies, gave native producers, especially the cotton millowners, almost a complete though temporary monopoly of the home market. During this period Shanghai and Tientsin became the chief industrial centres, and many industries showed a rapid expansion both in production and trade. Between 1913 and 1930 the number of cotton spindles increased by 270 per cent., silk exports by 60 per cent., coal output by 59 per cent., while that of iron-ore was nearly doubled. There was an excess of exports over imports for the only time in the history of China's foreign trade relations.

This period did not result in the establishment of many large-scale or heavy industrial enterprises. Chinese manufactures continued to be confined to secondary industries, organized on a small scale and retaining many handicraft characteristics. Much of the industrial development which did occur, particularly that in the cotton industry, was financed with foreign capital. After the cessation of hostilities in 1918 a period of prolonged depression began, many factories suspended operations, and some were sold to Japanese interests. The competition of the latter for control over China's economic resources became stronger. An unfavourable economic situation was worsened by the continuous internal disorder and political instability which prevailed during these years. Industrial production continued to grow, but on a much reduced scale. The output of coal in 1929 was 78 per cent. higher than in 1913, railway mileage had grown by approximately 33 per cent., and motor roads, which had hardly existed before 1920, had been considerably extended. The development of machine production was indicated by the increase of the imports of machinery and raw cotton, and in the number of cotton mills and factories.

In spite of these achievements, modern industrialization had hardly begun in China when the National Government came into power in 1928 except in a few favoured cities along the eastern seaboard. In cotton spinning, the industry in which modernization had made the greatest progress, she had fewer mills than England possessed

in 1795, and her output of coal equalled the production of that country in 1820. Industrialization had been uncontrolled, small in scale, and had been impeded by internal disorder, by the holding of key positions by foreign interests, and by the absence of a strong central authority in the country.

Industry under the National Government, 1928–37

In 1928 the National Government set about formulating a policy for industry, and in this the authorities were aided by their gain of tariff autonomy which enabled them for the first time to provide their infant industries with some measure of tariff protection. Their policy did not, as some feared, envisage the construction of a socialist economy, but allowed individual initiative the same freedom as in other capitalist countries. The progressive deterioration in the international situation, combined with the increased likelihood of an early clash with Japan, however, brought about a modification of their programme, and government enterprise began to emerge as a major programme. The invasion of Manchuria in 1931, and the disastrous Yangtze floods in the same year further encouraged the active participation of the State in economic affairs.

In its policy of industrial control the Government was concerned primarily with heavy rather than light industry, though wherever possible it tried to bring about a revival in the latter. The broad outlines of this policy, which had their origins in certain proposals made by Dr Sun Yat-sen, consisted of the operation in principle by the State itself of the heavier industries, leaving to private initiative all others except those declared to be State monopolies or which were deemed to be of strategic importance. In addition the Government set out to collaborate with private finance in the establishment of new enterprises, and undertook the active promotion of home industries in competition with imports from abroad.

The trend towards government control in industry was further shown by the setting up of the Cotton Industry Commission (1933), and the Sericultural Improvement Commission (1934) for the rehabilitation of the most important branches of China's modern industry. Subsequently the Ministry of Industry initiated the Three Year Plan for the industrial development of the Yangtze valley, and more specifically for the erection of a government machine shop and alcohol factory at Shanghai, and an ammonium sulphate factory in Pukow (Plate 53).

The step of greatest importance, however, was the formation of

the National Resources Commission in 1932 in response to the public demand for a strong national defence policy. This body succeeded in building up an effective organization, staffed by the best trained technical experts China had ever had, and in preparing a far-reaching programme for the development of heavy industries. From November 1932 to March 1935 it devoted itself exclusively to research and planning, and in the latter year was placed under the jurisdiction of the Military Affairs Commission. By July 1936 preparation was in an advanced stage, and work on the Three Year Plan commenced in the three Yangtze provinces of Kiangsu, Hunan, and Hupeh. The first concrete steps included the nationalization of tungsten, iron, and antimony, the construction of two big steel plants, the opening of two coal mines and three copper refineries, and the establishment of machine shops for the production of mechanical instruments. The development of electrical supply was also considered, but no final decision had been reached before the outbreak of the war.

In spite of the large number and ambitious character of the projects involved, little had been done to implement the various provisions of the Three Year Plan by early 1937. At that time it was still correct to say that China had no really important national industries. Such modern industries as had developed were almost exclusively light industries, with textiles occupying the dominant position. Basic industries such as iron and steel, apart from those developed by the Japanese in Manchuria, had made little or no progress, and even in light industries China was dependent upon imports for between 50 per cent. and 70 per cent. of her requirements. Factories in the coastal cities, controlled by foreigners and Chinese merchants under foreign influence, have been called 'industries in China' rather than Chinese industries. It was only after the outbreak of hostilities that Chinese industries were developed in accordance with the nation's policy of resistance and reconstruction.

Industrial Regions

The location of modern industry in China was determined by the requirements of external commerce and the existence of foreign interests, which were of course confined to the treaty ports. Industrialization was, therefore, largely confined to these ports situated on the coast and up the Yangtze valley, where modern commercial capitalism was predominant and the influence of the West strongest. The provinces concerned—Kwangtung, Kiangsu, Shantung, Hopeh,

and Liaoning—contained over a half of the mineral industry and nearly the whole of the cotton-spinning, silk-reeling, and oil-pressing activities. Railways, motor roads, and telegraphs were concentrated near the ports which handled most of the foreign trade. On the eve of the war modern industrialization, partly as a result of the Government's war preparations, was gradually spreading to hinterland regions served by railways and rivers, but remained practically non-existent in the interior, where traditional handicraft methods prevailed.

The location of industry showed little direct distributional relationship to the sources of power and raw materials. The provinces in question contained only a small proportion of China's coal reserves, though in respect of iron-ore there was a closer correspondence between the location of the deposits and industrial development. Liaoning, with two-thirds of the total iron-ore reserve, was a relatively industrialized province, but Sikang, Szechwan, and Chahar, in spite of their natural wealth, were little developed. Likewise the coal resources of Shansi and Shensi remained, as a whole, poorly exploited. The failure to develop modern industry near the coal and iron deposits may partly account for the slow progress of industrialization in China prior to 1937.

Before the Sino-Japanese war it was possible to distinguish six industrial regions which were relatively accessible to foreign intercourse, trade, and investment.

(1) *The Yangtze Delta*

The most important industrial region in China Proper was situated in the Yangtze delta within the triangle formed by the towns of Nanking, Shanghai, and Hangchow. Shanghai, the commercial metropolis of the region, owed its prosperity to favourable geographical and economic conditions. Situated at a vital point along the principal commercial thoroughfare of the country, occupying a central position between the north and south, and well served by railway facilities, it became the main outlet for a large, rich hinterland and the principal port for the receipt of foreign cotton, manufactured goods, and raw materials (Plates 46, 47, 49, 74-80 and pp. 296-300).

This region accounted for a large proportion of China's industrial enterprises, including two-thirds of the textile industry (cotton and silk), as well as large power stations and flour mills, cigarette factories, import and export concerns, and many other large and small industries. In Shanghai, before the war, there were some 250,000 workers in

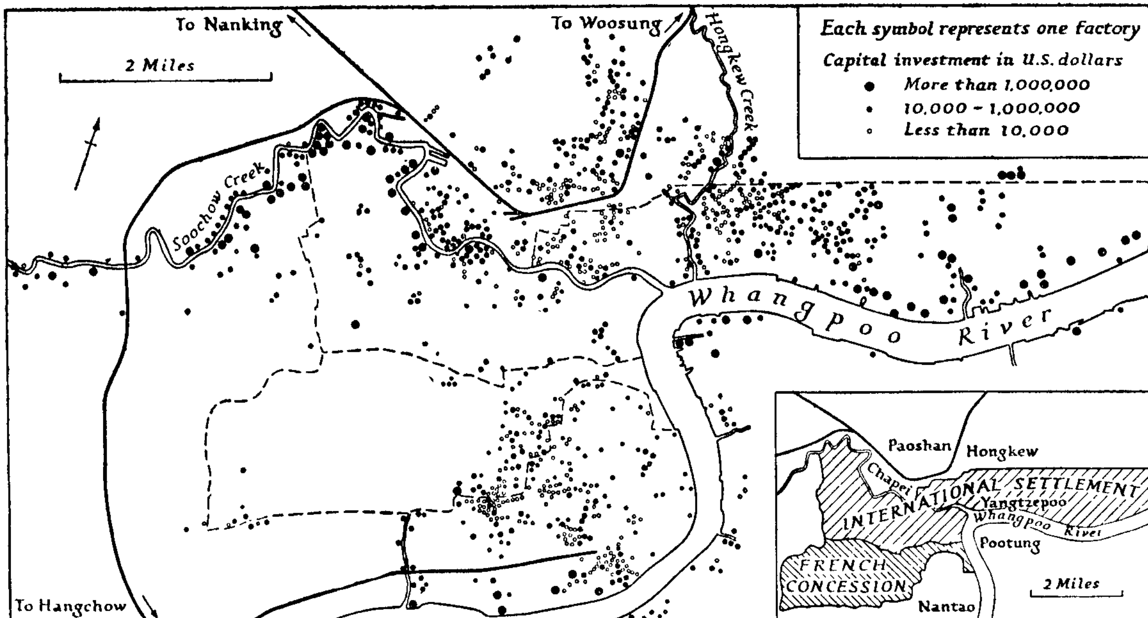

Fig. 33. Distribution of factories, Shanghai, 1928

Based on Orchard, J. E., 'Shanghai,' *Geographical Review*, vol. xxvi, p. 28. (New York, 1936

This map shows the location of large and small factories and their location along the rivers, creeks, and railways

large factories, and another 250,000 in smaller factories and domestic workshops. In fact, Shanghai was so important in the economic life of China that it had, according to a survey of the China Institute of Economic and Statistical Research in 1933–34, about half of all the factories in the country which came up to the standard of the Chinese factory law. The survey showed that out of a total of 2,435 such factories about 1,200 were in Shanghai alone (Fig. 33).

(2) *Southern Manchuria*

Liaoning in southern Manchuria ranked after the Yangtze delta in respect of trade and manufactures, but surpassed it in mining. It was the most important centre of heavy industry, and contained the famous iron and steel plants of Anshan and Penchihu, the Fushun coal mine (the largest in China), and chemical, cement, and other light industries. The loss of the area to Japan after 1931 greatly reduced the prospect of industrialization in China.

(3) *Northern Hopeh*

The third great industrial area in north-eastern Hopeh owed its development primarily to its proximity to the sea coast and to the facilities of the Tientsin-Pukow and the Peiping-Liaoning railways. Power resources were drawn from the Kaiping coal mines, the second largest in China (including Manchuria), while the Peiping-Suiyuan railway linked it with the wool-producing districts in the north-west.

Three main industrial centres had grown up; Tangshan (near Tientsin) with its large cement factory, salt refinery, railway shops, textile mills, and canning factory; Chinwangtao, with the largest glass factory in China, and its port which handled the shipments of coal from the Kaiping mines (see p. 422); and Tientsin, the chief port and also the largest textile centre in North China, with many factories for the preparation for export of raw materials, such as cotton, leather, eggs, and wool. The harbour at Tientsin is unsatisfactory (see p. 407), but its large hinterland, which consisted not only of the northern part of the plain but also of the north-western provinces and Mongolia, assured its rapid growth in the modern period.

(4) *Eastern Shantung*

The fourth major industrial concentration was in eastern Shantung, along the Tsinan–Tsingtao railway, where there were coal-mining and iron industries, textile mills, and vegetable oil plants. Tsingtao

Plate 45. China clay workings near Poyang hu, Kiangsi

China clay (kaolin) from deposits bordering Poyang hu is used in the historic pottery industry of Kingtechen.

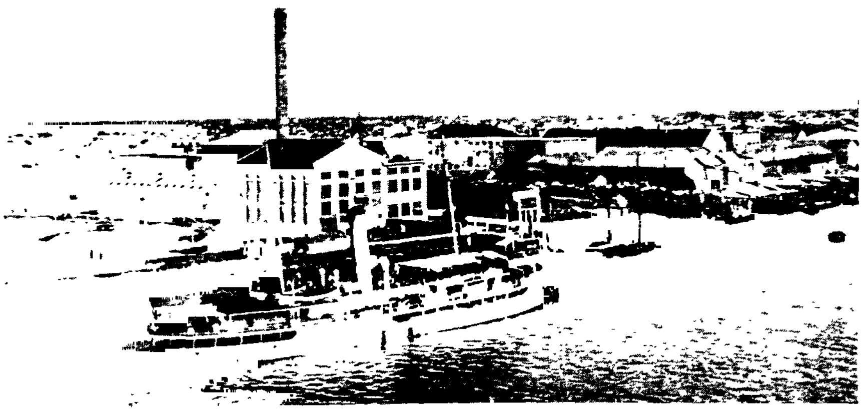

Plate 46. Pootung, Shanghai

Pootung, on the south bank of the Whangpoo, is an important industrial district. On the left is a cotton mill and beyond it, to the right, a tobacco factory.

Plate 47. Riverside power station, Shanghai

This plant, operated by the Shanghai Power Co., supplies by far the largest amount of electric power in the Greater Shanghai.

Plate 48. Municipal power station, Canton

This is one of two plants, serving the Canton area, and operated by a municipally controlled company.

was the chief manufacturing town, and also possessed one of the best harbours along the north-eastern coast. While it had the advantage of a superior harbour to Tientsin, it suffered the disadvantage of being farther from the hinterland, and therefore requiring a longer and more expensive rail haul.

(5) *Hunan and Hupeh*

China's most industrialized inland area was located in Hunan and Hupeh in the triangle between Hankow, Pinghsiang, and Changsha. The Wuhan towns of Hankow, Hanyang, and Wuchang were particularly well placed, situated as they were at the junction of the Yangtze and the Han rivers near the head of ocean navigation, and on the important north-south Peiping-Canton railway, completed in 1936. Of the three, Hankow with its bund and foreign concessions was regarded as the commercial, Hanyang as the industrial, and Wuchang as the administrative and intellectual centre (see p. 348).

The most famous industrial plant in the region was the Hanyehping Coal and Iron Company, the largest iron and steel works in China Proper, although in 1937 it had practically ceased to function. Hankow and Wuchang had several textile mills and industries for the preparation of export products such as eggs, tea, cotton, wood-oil, lead, and vegetable oils, while Changsha had textile factories, flour mills, and refineries for non-ferrous metals.

(6) *The Canton Delta*

The sixth and last industrial centre was situated in the Canton delta, principally along the Canton-Kowloon railway. There was no heavy industry in this region, and most of the light industrial establishments, for example the silk filatures, were not of a modern character. Canton was the fourth largest commercial focus in China, but its growth as a port had been stunted by the competition of Hong Kong (see p. 254).

PRINCIPAL INDUSTRIES

The manufacturing industries which had developed prior to the Sino-Japanese war were mainly of the light type, neither heavy nor basic. The principal branches were cotton spinning and weaving, hosiery knitting, silk reeling, woollen spinning and weaving, flour milling, oil pressing, printing, and cigarette making. Heavy industries such as iron and steel, machine making, shipbuilding, electric

power generation had, in spite of the Government's efforts, undergone only a very gradual and limited expansion.

The following survey is by no means inclusive of all the manufacturing enterprises which existed before the Sino-Japanese war. But the description of these industries shows that in spite of the more active role played by the National Government, the outstanding characteristics of the country's industrial structure remained small-scale organization, under-capitalization, severe competition from the foreign goods and products of foreign concerns in China, and the absence of large-scale planning in the development of specific industries.

Cotton Industry

Of all the modern industries established in China before 1937 cotton textile manufacturing was by far the most important, both in terms of the volume and value of production and the use of modern mechanized equipment. Modern mills were first set up by foreign interests after the Treaty of Shimonoseki, 1895, but within a short time Chinese-owned concerns made their appearance. The war of 1914–18, which checked exports from Europe, provided a boom period for the industry, and between 1915 and 1920 the number of cotton mills doubled, spindlage increased by nearly 50 per cent., and the number of looms by more than 200 per cent. During the early post-war depression, however, a large number of the Chinese mills failed or were bought up by the Japanese, who had been rapidly extending their hold on the industry since 1914. While the number of spindles in Chinese mills increased from 889,000 to 2,885,785 between 1919 and 1933, in Japanese-controlled mills the number increased from 333,000 to 2,098,176. Chinese mills had 7,740 looms in 1920 and 20,296 in 1933, while the number in Japanese mills increased from 1,486 in 1920 to 19,017 in 1933. During the period of the world depression (1929–33) the smaller, under-capitalized Chinese concerns had again to give way before the larger capitalization and superior equipment of foreign-owned businesses.

In 1936 the position in the cotton industry was given as follows: There were 142 cotton mills in China, of which 93 were owned by Chinese, 45 by Japanese, and 4 by British interests; the Chinese had 41 in Shanghai, 22 in Kiangsu, 10 in Hopeh, 7 in Hupeh, 4 in Honan, 3 in Chekiang, 4 in Shantung, 5 in Shansi, 2 in Shensi, and 1 each in Anhwei, Kiangsi, Hunan, Kwangtung, and Sinkiang; the Japanese had 32 in Shanghai, 9 in Tsingtao, 4 in Tientsin, and 1 in

Spindlage of Cotton Mills in China

Year	Chinese	Japanese	British	Total
1895	221,744	22,432	72,312	316,488
1900	416,056	149,608	72,312	637,976
1905	484,126	149,608	72,312	706,056
1910	651,676	172,648	97,688	922,012
1915	687,964	307,048	153,320	1,148,332
1920	1,358,552	540,752	153,320	2,052,624
1925	2,256,624	1,636,156	153,320	4,046,100
1930	2,395,792	1,674,844	153,320	4,223,956
1936	2,690,218	2,159,568	221,336	5,071,122

Source: Lieu, D. K., *The Growth and Industrialization of Shanghai*, pp. 421–22 (Shanghai, 1936).

Hankow; while the 4 British were in Shanghai. Of the total of 5,071,122 spindles in China, 2,690,218 (53·06 per cent.) were under Chinese control, and 2,159,568 (42·58 per cent.) and 221,336 (4·36 per cent.) in Japanese and British mills respectively.

From its beginning cotton manufacturing was highly localized, but not necessarily in areas which had the greatest geographical and economic advantages. In 1918 nearly 62 per cent. of the total number of spindles were in the city of Shanghai, which in 1930 still accounted for nearly 57 per cent., followed by Tsingtao (7·88 per cent.), Wuhan (7·33 per cent.), and Tientsin (5·7 per cent.). Although economic factors were important, this distribution was largely conditioned by political considerations. The chief attraction was the security and freedom from political unrest offered by territories under foreign control. The treaty ports were accordingly able to draw to themselves a disproportionately large share of the wealth and enterprise of China, and became, in nearly every case, centres of both foreign and domestic development. They were well placed for the growth of foreign enterprise, and the Japanese, in particular, realized the advantages of investments in mills in China, where labour was cheap, hours of work long, and where saving could be effected through exemption from tariff duties. During the thirties the hold of the Japanese upon the industry increased, because their stronger financial reserves enabled them to withstand the strain of the world economic depression more successfully than the smaller, under-capitalized Chinese concerns (Plates 49, 50).

When political conditions became more settled after 1933 natural economic forces were allowed freer play, and there was a tendency

for a wider geographical diffusion of the mills. Chinese capitalists began to set up plants in the interior instead of confining their activities to the coastal centres. These new mills, usually located nearer to the raw material and in closer touch with the large native market, were able to derive buying and transport economies which helped them to hold their own with Japanese merchants. Partly as a result of this general trend Shanghai began to lose its dominant position in the industry, and in 1935 accounted for only 51 per cent. of the total number of spindles in China. The shift of industry to less industrialized districts was quite pronounced in certain areas, such as Wuhan and Canton, and in parts of Shantung, Shensi, and Honan. When war broke out Chinese industrialists were planning to establish further plants in the provinces of Hunan, Honan, Shensi, Yunnan, and Szechwan.

The importance of the cotton industry was clearly reflected in the gradual decline in the imports of finished goods into China. From 1885 to 1930 cotton goods, including yarn, but not raw cotton, headed the list of all imports in value. But in 1931 this item dropped to second place, in 1932 to third, in 1933 to sixth, in 1934 to twelfth, and in 1935 to thirteenth.

The drop was due to the rapid development of domestic production and to general economic pressure which was making China's self-sufficiency complete. But expansion was most marked in the foreign sections of the industry, and imports were to some extent replaced by the products of Japanese and British concerns in China. On the other hand, Japan and Britain had been the chief suppliers of cotton goods in the past, and as is shown by the following table, they had to bear the brunt of the decline :

Imports of Cotton Goods from Great Britain and Japan (in millions of dollars) [1]

	Japan	Great Britain
1933	33·1	20·0
1934	15·2	10·1
1935	15·4	5·3
1936	8·5	3·2

Source: Woodhead, H. G. W. (editor), *China Year Book* 1939, p. 72 (Shanghai, 1939).

[1] Except where otherwise stated 'dollars' refers to Chinese National Currency dollars.

These domestic developments brought about a greater decline in the imports of yarn than in finished goods. In 1913, 360 million pounds of cotton yarn were purchased abroad while 225 million were produced in China. By 1924 the import figure had dropped to 77 million, and home production had reached 590 million; by 1929 imports were down to 31 million, while home production had risen to 943 million. Subsequently there was a decline as a result of depression to an estimated 882 million pounds in 1936, but of this China managed to export 17 million.

Power weaving developed more slowly than spinning, and it was only after 1930 that the increase in the local production of cotton cloth brought about a marked decline in purchases from abroad. The decline was greatest in the coarse lines in which the local manufacturers could most easily compete. After 1930 the decline was heavy and progressive, and by 1937 the home market was mainly the preserve of Chinese mills though not necessarily Chinese-owned mills.

Chinese cotton mills also began to make their contribution to the export trade. Finished goods constituted about one-eighth of China's exports in value, amounting to over $24,000,000 in 1936, an increase of $6,000,000 over the previous year. They were exported mainly to Korea, Japan, Manchuria, and to Hong Kong (for re-export), while the Netherlands East Indies, Malaya, and Egypt provided relatively insignificant markets.

As was natural in the circumstances the National Government paid considerable attention to the most important modern type of industry in China. In 1933 the task of rehabilitation was entrusted to the Cotton Industry Commission. The Commission was primarily concerned with improving the quality of raw cotton, but some attention was paid to reform on the industrial side. In collaboration with *Academia Sinica*, the Commission established a national laboratory for research in the technology of spinning, weaving, and dyeing. In 1935 a set of preliminary standards covering in detail labour, wages, materials, output, and costs involved in spinning and weaving operations was prepared and circulated among the mills as guiding principles in their management. Unfortunately, these promising developments and many others in the planning stage were cut short by the outbreak of the war in 1937.

Knitting Industry

Small knitting factories were established in China for the manufacture of underwear and hosiery in the early years of the present

century. Just before the war of 1914–18 knitting machines operated by electricity were introduced, and new factories were built to utilize such machines, while at the same time many old ones also installed them in their plants. It is interesting to note that this industry has been almost completely assimilated to the traditional industrial system. The small size and low cost of the hosiery knitting machine make it adaptable to the requirement of cottage industries. Prior to 1937 many peasant families kept a couple of these machines and knitted hosiery for sale to supplement their limited incomes. Usually knitting factories rented machines to the peasants, supplied them with yarn, and purchased their products at agreed prices. The industry flourished in the neighbourhood of Pinghu, Chekiang, and around Foochow, in Fukien. There is no information of the number of household workshops engaged, but of organized mills there were, in 1935, 1,714 knitting mills in China with an annual production valued at more than $27,000,000.

Silk Industry

Next to cotton, silk is the largest factory industry in the textile group, and in its modern development can be said to date from the Treaty of Shimonoseki, 1895. Before the Sino-Japanese war Shanghai was the principal centre, the number of silk filatures increasing from 12 in 1895 to 61 in 1916 and 107 in 1930. Wusih was the second largest centre of the silk industry in the Yangtze valley and, compared with Shanghai, its filatures had lower operating costs and more modern types of reels. In Chekiang the filatures were located in Hangchow, Huchow, Kashing, Teching, Haining, and Haiyen. Namhoi and Shunteh were notable centres in Kwangtung, and there were less important ones in Anhwei, Hupeh, Shantung, Honan, Shansi, Shensi, and Szechwan. Chefoo was well-known for its pongee (from tussah silk), but most of the filatures in Shantung produced the same kind of silk as that of Kiangsu and Chekiang. The total production of raw silk for 1935 was 47,500 quintals, of which Kiangsu and Chekiang contributed about 30,000, Kwangtung 12,500 and Szechwan, Hupeh, and Shantung 5,000.

Both the silk-reeling and weaving industries were very badly hit during the world depression, by increasing Japanese competition and by the invasion of rayon in the domestic market. In 1934 only 5 of the 107 silk filatures in Shanghai were working and the factories in Chekiang had almost completely suspended operations. Although there was a brief revival in 1935 the situation remained serious,

since not only the filatures and weaving mills but also the farmers in the silkworm raising districts, who relied on their cocoons and hand-reeled silk for a half of their income, were also affected. As in the case of the cotton industry, the Government's plans for reconstruction were only in the planning stage in 1937.

Woollen Industry

The manufacture of woollen piece-goods as a clothing material is a relatively recent development in China. Before 1911 the people demanded little wool for clothing, and consequently the factories which did exist conducted manufacturing on a small scale. After 1928 a boom took place, and there was a greater realization of the importance of the industry. By 1936 there were 8 woollen yarn factories, 5 in Shanghai and one each in Tientsin, Tatung, and Paotow, and about a dozen factories with modern equipment producing coarse woollen textiles. Among these were 4 government-operated factories, namely those of the Ministry of War at Peiping and of the provincial governments at Taiyuan, Kweisui, and Canton. They produced in the main only coarse materials, but those at Peiping and Canton were said to be capable of turning out good worsted fabrics. There were also some 34 factories engaged in the manufacture of ' camel hair cloth ' (fleece lining) mostly in Shanghai. The total output of the Chinese-owned mills (about half a million yards per annum) was far from sufficient to supply either military or civilian requirements, and about 6,000 tons of carded wool and yarn were imported each year mainly from the United Kingdom and Japan (Plate 51).

Flour Milling

Wheat is the principal foodstuff in North China, and its manufacture into flour, therefore, forms an industry of the first magnitude. The wheat produced in Manchuria is most suitable, that of Shantung next, while the production of northern Kiangsu and the Hankow area is hard and not well adapted to milling. Before the Sino-Japanese war, Tientsin, Tsinan, Shanghai, and Hankow were important centres primarily because of their advantages as points of distribution (Plate 52).

In 1936 there were 94 modern mills in China nearly all of which were Chinese-owned, but their output by no means covered requirements. The deficit was made good chiefly by the production of old-fashioned mills and partly by imports from abroad. Except

during the period of 1915 to 1921, China's imports of flour have always greatly exceeded her exports, reaching their peak in 1929 when 7,459,543 quintals were imported mainly from Australia and Canada, as against exports of only 16,717 quintals. In later years this import surplus was reduced, and in 1936 China imported only 310,068 quintals while exporting 92,172 quintals.

Sugar Refining

In spite of attempts to build up a refining industry only a few mills were in operation in 1936. Of these, 6 were in Kwangtung, and one each in Kwangsi, Shantung, and Chekiang—the last being operated by a co-operative society on a very small scale. In Shantung the Pu Yi Industrial Company had a capacity of 50,000 tons annually, but the supply of raw material was inadequate, and the output was about 10,000 a year.

Tobacco Industry

In 1936 the British American Tobacco Company (B.A.T.) had a virtual monopoly of the cigarette-manufacturing industry in China, although Japanese companies were beginning to compete in North

Sales of Chinese and Foreign Cigarettes, 1932–35 (*in billions*)

Year	Total Number sold	From Chinese Factories		From Foreign Factories in China	
		No.	Per cent.	No.	Per cent.
1932	58·7	23·9	40·7	34·1	58·0
1933	88·6	25·5	28·8	62·8	70·9
1934	53·0	27·9	52·7	24·9	46·9
1935	57·4	23·1	40·3	34·1	59·4
Total .	257·7	100·4	38·9	155·9	60·5

Source: Chen Han-seng, *Industrial Capital and Chinese Peasants*, p. 38 (Shanghai, 1939).

China. The B.A.T. operated large factories in the coastal centres, and had its own leaf-baking and leaf-collecting system in the tobacco-growing areas of the interior. In contrast most Chinese mills were

very small establishments, and after a brief period of prosperity during the war of 1914–18 the industry began to decline. It has always been concentrated in Shanghai, but the number of factories in that city dropped from 186 in 1924 to 67 in 1935.

This decline was not due to any slackening in demand, but to the failure of Chinese mills to hold their own against foreign competition. In 1935 approximately 60 per cent. of the cigarettes sold in China came from foreign-owned factories or from abroad. In 1935, as compared with 1934, the market for Chinese cigarettes decreased by 18 per cent., while that for the products of foreign factories in China rose by 37 per cent.

Iron and Steel Manufacturing

While smelting furnaces were mostly failures there were a large number of foundries and machine shops in China during the period under review. The machine shops were usually of small size, generally having the founding done by independent foundries. In 1936 there were 270 machine shops and factories registered under the Chinese Factory Act, their size being indicated by the fact that their total capitalization consisted of only $3,550,000. A government survey, published in the same year, gave a total of 625 machinery makers, including the 270 subject to the Factory Act in the industrial centres of Shanghai, Tientsin, Tsingtao, Canton, Hankow, and Wusih. Although most of these were small and poorly equipped, they were able to produce a wide range of simpler types of machinery for the textile, printing, flour, tobacco, and rice milling industries. Steam and petrol engines were supplied to all industries, while lathes, drills, punches, cranes, and pumps had a good market all over the country. The value of machinery produced was estimated at $20,000,000 annually, which, though small, did indicate an increase in knowledge of engineering technique which proved invaluable when the Sino-Japanese war broke out.

By 1937 the National Government had also made a start on its Three Year Plan for heavy industry. The Central Machine Works, at first located in Nanking, was approaching completion. This project was made possible by a grant from the Sino-British Boxer Indemnity Fund, it being specified that two-thirds of the money should be used to buy the necessary machinery from Great Britain. Orders had been placed with a German firm for the construction of large Government iron and steel works—to be known as the Siang River Arsenal—at Chuchow in Hunan ; and in April 1937 an agree-

ment was concluded with British interests for the construction of a central railway shop in the same area.

In the discussion of machine works, those manufacturing electrical machinery have not so far been included. The largest number of such mills were located in Shanghai, where they turned out electrical generators, motors, fans, stoves, etc. One of the most successful branches of this industry was the manufacture of electric bulbs. In 1936 there were 15 Chinese-owned factories with an estimated output of 15,000,000 bulbs, and foreign-controlled concerns accounted for another 5,000,000. The industry drew upon local supplies of lead and glass, but imported most of its metal requirements. Since China is the chief tungsten-producing country, it is considered that steps should be taken to set up a plant for the manufacture of filament wire to supply the industry.

Chemical Industry

Before the Sino-Japanese war a beginning had been made in the manufacture of chemical products, but the industry was still relatively weak. Heavy acid plants were in operation at Shanghai, Canton, and in Honan. Early in 1937 the government-owned synthetic nitrogen factory was opened near Nanking with an estimated annual production of 50,000 tons of sulphate of ammonia. There had also been a steady increase in alkali production, and China was producing over half her total requirements. Two sulphuric acid plants and two electro-chemical plants in Shanghai supplied a large proportion of her consumption of sulphuric, nitric, and hydrochloric acids. The two sulphuric acid plants could have supplied the whole requirements of Chinese industry, but Japanese acid found a ready market by reason of its low price. Simple dyestuffs were also being manufactured, though in comparatively small quantities (Plate 53).

Match Industry

In 1936 there were about 42 modern match factories in China, and a considerable number of small establishments many of which used no motive power at all. Large quantities of matches were produced, practically covering domestic needs and allowing of a small export to neighbouring countries. It was estimated that the total annual production was about 850,000 units of 7,500 boxes each. In North China the industry received many set-backs after 1931 owing to smuggling activities and cut-throat competition among the Chinese themselves. By 1935 there were signs of re-

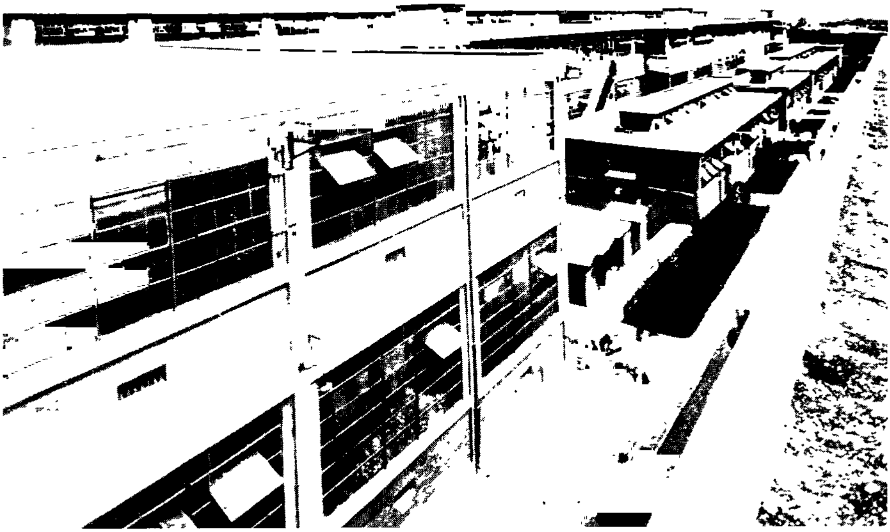

Plate 49. Cotton mill, Shanghai

The spinning mill, carpenters' and machine shops of one of the mills owned by the Wing On Textile Manufacturing Company.

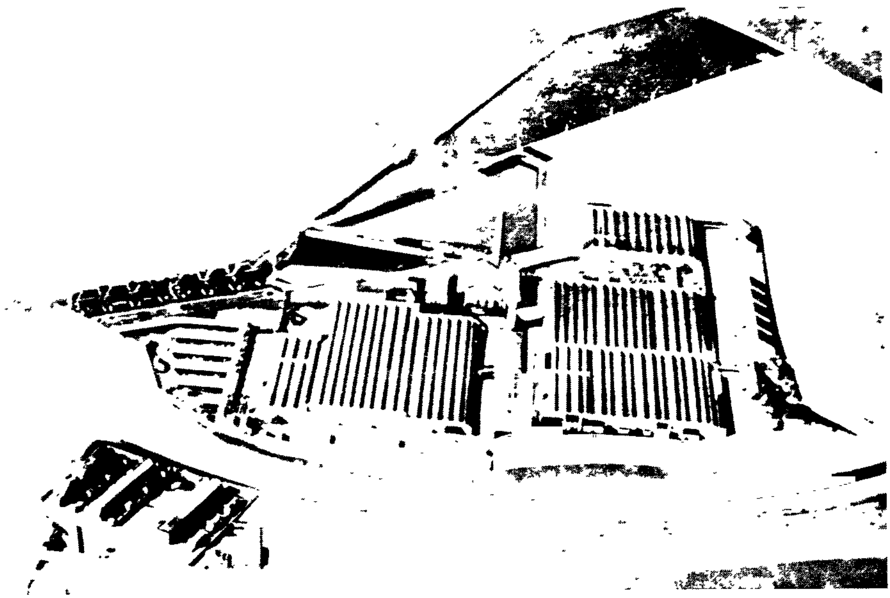

Plate 50. Cotton mill, Tsingtao

An aerial view of the Japan Cotton Spinning Company's mill at Tsingtao, where the industry was dominated by Japanese interests.

Plate 51. Carpet factory, Tientsin

The Nichols Carpet factory, the largest in China, at Tientsin, the leading centre of the industry.

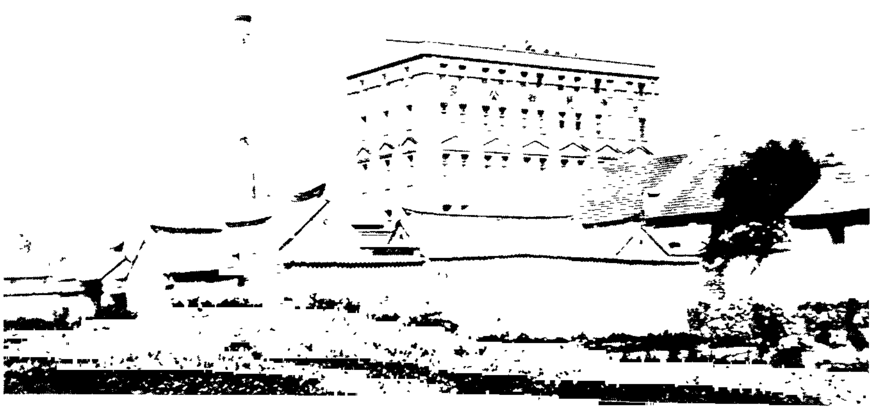

Plate 52. Flour mill, Tsinan, Shantung

covery after efforts had been made to control production and prices and place the industry on a sounder basis.

Paper Industry

In 1936 China possessed 18 modern paper mills, located for the most part in Chekiang and Kiangsu. They were chiefly engaged in the production of Chinese paper and cardboard, although the manufacture of foreign types of printing paper was increasing. However, China was still largely dependent on imports, and in 1936 her foreign purchases amounted to $57,500,000, mainly from Germany, Japan, the United States, and Great Britain. Just before the Sino-Japanese war attempts were made to strengthen the industry. The Wenchi Paper Mills in eastern Chekiang were in process of organization by the National Government and private interests, while the Kwangtung Paper Mills at Canton had completed the construction of its plant.

Cement Industry

China's consumption of cement has been increasing in recent years as a result of the extensive building programmes of the National and provincial governments. In 1934 there were more than a dozen modern plants, half of them having a capacity of at least 1,000 barrels a day. The largest were of the Chee Hsin Cement Factory in Tangshan (Hopeh), the China Portland Cement Company in Luntai (Kiangsu), the Shanghai Portland Cement Works in Lunghwa (Kiangsu), and the Hsitsun Cement Works in Canton. Of the raw materials required for the industry, gypsum was imported mainly from Germany, while limestone and clay were procured locally. The Shanghai Cement Works obtained its supply of limestone from its own mine at Changhing in Chekiang.

Keen competition from abroad, particularly Japanese dumping of cement at extremely low prices, prevented the Chinese companies from profiting from this domestic demand. During 1936, however, efforts were made to improve marketing facilities and manufacturing processes. Three new plants were established, several factories resumed operations, and the China Portland Cement Company and the Hsitsun Cement Works installed new machinery, thereby increasing their productive capacity from 900,000 to 1,350,000 barrels per year. The total production of cement in 1936 was 4,350,000 barrels, and this was expected to increase to 7,300,000 barrels as a result of expanded capacity and the completion of new plants.

Porcelain Industry

Mention must be made of the Kingtechen potteries in Kiangsi, which are among the most outstanding workshops in China. They were established in A.D. 200 for the purpose of manufacturing pottery for the Imperial household, and have acquired an international reputation. In 1936 Kingtechen had 160 furnaces and employed 150,000 workmen, but at one time in its history it had 500 furnaces and employed 1,000,000 workmen. The plant has no modern machinery of any kind, making it necessary to turn out practically every piece of pottery by hand or foot. The kilns number in the neighbourhood of 100, but they are not all active at the same time, and are heated mostly with straw and wood (Plates 45, 54).

The excellence of Kiangsi porcelain is mainly due to the kaolin (China clay) which abounds in the province, particularly near the Kuling range (Lu shan), from which it takes its name. Kaolin is a decomposed granite made into paste, and forms an important ingredient in the manufacture of all kinds of porcelain. Although this commodity is not manufactured for export, China has the reputation, raw materials, and skill necessary for the development of an important ceramic industry.

WAR-TIME DEVELOPMENTS, 1937–44

INDUSTRIAL POLICY

Although the Japanese invasion found China without any comprehensive plan for mobilization, the urgent need for war-time industrial production has forced her to develop her resources with unusual rapidity, and has greatly stimulated the trend towards economic control. War-time economic control aims first at augmenting the productive equipment of the nation and accelerating the process of production, and, secondly, at a more efficient utilization of existing equipment and a more purposeful distribution of the wealth already produced. Government enterprise continues to be officially regarded as a means of supplementing private initiative, and not as a method of gradually eliminating private ownership and socializing the economic system. The declared policy is that State activities should be restricted to the following types of enterprise: enterprises urgently needed by the Government and requiring specialized management; enterprises too large or difficult to be

undertaken by private *entrepreneurs*; enterprises urgently needed for national defence, but offering no prospect of a profit for the private investor; and enterprises supplying power and fuel to private companies. The growth of government enterprise has, therefore, been accompanied by a programme of encouragement and control of private business activity, which will lead not to its elimination but to its growth.

State economic policy has been developed to overcome the initial reverses suffered at the hands of the Japanese on the industrial front, and to build up and strengthen war economy. The outstanding war-time achievements have been the removal of several hundred factories, both government and private, to the interior provinces of Szechwan, Yunnan, and Kwangsi, and the western parts of Hunan and Shensi; the establishment of new State-owned enterprises in the south-west and north-west, including arsenals, electrical undertakings, cement works, and alcohol plants; the rapid growth of the industrial co-operative movement which, in addition to its economic value, has a great social significance.

The creation of industrial bases for heavy and light industries in 'Free China' has helped to bring about an invaluable increase in industrial production at a time when China is virtually cut off from the outside world and thrown largely on her own resources. The position has, nevertheless, become very critical since early 1943, and the productivity of industry is declining. The immediate cause of the present crisis (1944) is the breakdown of communications, not only in China's supply routes with the outside world, but more especially of the means of transport within her own frontiers.

To carry out its war-time programme the Government has further elaborated its machinery of control. Three bodies—two governmental and one semi-public—are mainly responsible for increases in industrial production:

(1) *The National Resources Commission.* This has become the chief agency for the operation of government enterprises, especially those concerned with the heavy industries. Its function is defined in its organic law as the promotion and management of basic industries, important mining enterprises, and water and electric power plants. Its internal organization comprises an industrial bureau, a mining bureau, an electrical division, a technical division, an economic research division, and a purchasing bureau.

(2) *The Industrial and Mining Adjustment Administration.* Set up at the beginning of the war as part of the National Military Council,

this body was transferred to the Ministry of Economics in January 1938. It has been primarily concerned with assisting the removal of private industries from the threatened areas to new bases in 'Free China.' It has been empowered to provide technical and financial aid; to plan, supervise, and direct industrial and mining enterprises; and to carry out a study of investment and other matters relating to the use of capital in mining and industrial enterprises.

(3) *The Chinese Industrial Co-operative Movement.* In the last few years the Chinese Industrial Co-operative Movement (also known as 'C.I.C.,' or 'Indusco') had played an increasingly important part in the national war effort. It was sponsored in the autumn of 1938 by Dr H. H. Kung, then President of the Executive Yuan, and has been partly dependent upon government grants. The object of the movement is to construct chains of small industries using local materials to supply manufactured goods necessary to the armies in the field, and more generally to the life of the people under a co-operative form of industry. The expansion of the movement (see p. 154) has been rapid, and in 1942 there were approximately 1,600 separate societies with a combined membership of nearly 23,000.

Even in such a movement as 'Indusco' the tendency is towards government control, although this has been resisted by its leaders. A number of government spokesmen, however, have taken the view that, as part of the national reconstruction programme promoted by the State, the industrial co-operatives should be managed by a central organization which should exercise a unifying control over the whole movement. This is sometimes criticized by those who hope to see it develop into a democratic, popularly controlled movement.

The Transfer of Industry

The grim necessity of war has forced China's leaders to turn their attention to the south-west and north-west of their country, and has given these areas such a stimulus to economic growth that their development is likely to prove of epoch-making importance. Before the war China had 3,849 factories, of which 1,290 were in Shanghai and only 279 in the hinterland. There were only 33 factories in Szechwan, and throughout the interior there was no cement factory, alcohol distillery, nor oil refinery. Coal mines and iron mines, which numbered 745 and 33 respectively, were operated by native methods on a very small scale. By the end of 1941, according to official sources, there were 1,350 privately owned industrial plants

scattered throughout ' Free China ' using mechanized power, in addition to the 108 units of heavy industries under the control and direction of the National Resources Commission of the Ministry of Economic Affairs. Many industrial projects were being developed, and a five year plan of reconstruction was already being mapped out by the Government. A remarkable transformation is therefore taking place, and six years of war have done much to change the interior of China from a medieval to a modern economic state.

This transformation was made necessary by the very serious war-time industrial losses. In the first eighteen months of the war Japan occupied nearly all China's key industrial areas in the east and captured the greater part of all the modern industrial equipment she possessed. The task of the National Government was therefore an extremely difficult one, and was afterwards aggravated by the Japanese blockade of the sea-coast. All imported machinery and materials had to come into China through French Indo-China, later through Burma, and at the present time mainly by aerial transport from India to Kunming. Facilities for the transport of such supplies as machines, tools, and building materials, and skilled labour were comparatively deficient in the western provinces. In spite of these difficulties and handicaps the Government had by 1942 attained substantial success in its programme. Since then, however, industrial development has been arrested by the excessive inflation and the breakdown of communications. The situation remains confused and this, combined with the difficulty of distinguishing between actual achievements and paper plans in government reports, makes the following description of some of the main changes of necessity extremely general.

The remarkable work of the National Resources Commission (see p. 139) is seen at its best in the migration of factories and their redistribution in the interior. As soon as hostilities broke out in Shanghai in August 1937 it was decided, as far as practicable, to move to safer places the numerous Chinese factories found in the vicinity of that city and along the Nanking-Shanghai railway. But many of these factories had already suffered irreparable losses when the Commission began its salvaging campaign. Nevertheless it did succeed in moving out over 140 factories from this region, first to Hankow and thence to the south-west and north-west. The work was later extended to such inland places as Chengchow, Tayeh, and the Wuhan area.

By the end of 1940 the transfer of industry had been largely com-

pleted. Altogether 452 factories had been removed from Shanghai, Hankow, and Ichang, and of these 250 were reassembled in Szechwan, 121 in Hunan, 43 in Shensi, 21 in Kwangsi, and 13 in other provinces. Over 116,000 tons of equipment were transported to the west, of which a large proportion belonged to the Hanyehping Iron and Steel Works in Hanyang, now reinstalled in Chungking. In addition, various bodies had organized the transfer of refugees to the interior, and by 1941 over 12,000 skilled workers had been brought to the new centres of industry.

The total amount of salvaged equipment may not seem large when compared with the standards of western industrial countries, yet its transfer to areas where industrial development was non-existent must be considered of tremendous significance at this time of crisis. The equipment removed represented the most indispensable part of a basic industrial set-up for war-time production selected only after careful consideration of needs and priorities. These factories, producing a wide selection of products for both military and civilian requirements, have laid the foundation for war-time industrial mobilization in these provinces. They have markedly accelerated a process of economic expansion, which under normal circumstances would have been delayed and under unfavourable circumstances would not have taken place at all.

State-owned Industry

War-time developments in heavy industry have been largely a continuation of the Three Year Plan worked out by the National Resources Commission but interrupted and modified by the war. When hostilities broke out, drastic changes in the plan, which was then well under way, were called for. The projects in process of development, located in the provinces of Hunan, Hupeh, and Kiangsi, were soon threatened by the enemy, and many of them had to be abandoned or removed to the interior. Since then the National Resources Commission, from bases in the west, has pushed on its programme for the building up of new heavy industries. This work assumed a vital importance after the outbreak of the Pacific war in December 1941, and the cutting of China's last few remaining lines of communication with the outside world.

In 1942 the Commission controlled 41 factories, 43 mines, and 24 power stations, totalling 108 units. The most important machine-making factory, the Central Machine Works, which was removed

from Hunan to Kunming at the outbreak of the war, has been turning out boilers, gas engines, and machine tools, as well as supplying equipment to the armed forces. A branch factory of the Central Machine Works in Sui, Szechwan, has been operating since November 1941. Several government-owned electrical equipment factories have been established, the largest being the Central Electrical Manufacturing Works with its main factories at Kunming and Kweilin, and subsidiaries in Chungking and Lanchow. The products of these factories consist of copper wire, cables, lamp bulbs, motors, generators, batteries, etc. The Central Radio Manufacturing Works, located in Kweilin with branch factories in Chungking and Kunming, manufactures broadcasting receivers and code transmitting and receiving sets. Another important enterprise is the Central Insulator Works, situated at Yuanling, Hunan, with a branch factory at Sui, Szechwan. It began production in 1938, turning out both high and low tension insulators.

PRIVATE INDUSTRY

The Government also encourages and assists the establishment of private industrial enterprises as a means to supplement State-controlled industries, but at the same time has adopted adequate control measures. The National Mobilization Act, enforced in May 1942, emphasizes the rational distribution of factories to ensure a better supply of raw material, labour, power, and markets, and permits the exercise of greater control over private factories. Wherever possible production standards are to be raised in order to ensure economy in raw materials and labour.

The general position of private industry at the end of 1941 has been given as follows. Between one and two thousand factories, which include old ones, new ones, and those which have been removed from the east, were scattered throughout 'Free China.' Most of these factories were concentrated in the Chungking area, Hunan ranked second, and Szechwan (excluding Chungking) third. Szechwan and Hunan enjoyed their predominant position by virtue of their superior communication and transport facilities. Metallurgical factories had been increased from 4 to 87, machine works from 37 to 376 units, electrical appliances factories from 1 to 44, chemical works from 78 to 380, and spinning and weaving factories from 102 to 273. There were 3 cement plants in operation, and modern paper mills using machinery for production had increased from 3 to 17.

A later report, dated May 1942, indicates that there are nearly 2,000 private factories using mechanical power for production and gives the following distributions.

Geographical Distribution of Privately Owned Factories in 'Free China'

Province or Municipality	No. of Factories
Chungking	584
Szechwan (excluding Chungking)	352
Kweichow	49
Yunnan	49
Kwangsi	173
Kwangtung	13
Hunan	368
Hupeh	9
Fukien	23
Kiangsi	55
Shensi	170
Kansu	63
Sikang	7
Total	1,915

Percentage Distribution of Privately Owned Factories by Industries

Metallurgical	7·10
Machinery	28·55
Electrical appliances	3·15
Chemical	27·24
Textile and clothing	22·72
Food	5·15
Printing	2·85
Others	3·24
Total	100·0

Source: Chinese Ministry of Information, *China Handbook* 1937–1943, p. 441 (New York, 1943).

PROVINCIAL DEVELOPMENT CORPORATIONS

While the National Resources Commission is in charge of industrial planning on a national scale, the provincial governments have established provincial development corporations for the purpose of exploiting provincial resources and assisting local industries. By 1942 fourteen provincial development corporations had been established.

Name of Corporation	Year of Inauguration	Capital (in dollars)
Kweichow Development Corporation	1939	15,000,000
Fukien Development Corporation	1940	35,000,000
Shensi Development Corporation	1940	20,000,000
Anhwei Development Corporation	1941	10,000,000
Kwangsi Development Corporation	1941	30,000,000
Kwangtung Development Corporation	1941	40,000,000
Kiangsi Development Corporation	not given	not given
Yunnan Enterprise Bureau	1941	not given
Szechwan-Sikang Development Corporation	1942	70,000,000
West Yunnan Development Corporation	not given	40,000,000
Kansu Development Corporation	1942	20,000,000
Hupeh Development Corporation	not given	50,000,000
Suiyuan Development Corporation	1942	5,000,000
Sikang Development Corporation	not given	not given

Source: *Contemporary China*, vol. xi, p. 4 (New York, 1942).

These provincial authorities have established many factories in recent years, and several of them have mapped out three-year or five-year development plans. The Szechwan government, for example, owns 50 industrial plants; the Kweichow Development Corporation is operating chemical, machine, electrical, and cement industries; the Kansu Development Corporation controls some 30 industrial units.

New Industrial Regions

At the time of writing (December 1944) all the major industrial areas (see p. 124) are temporarily lost to the Japanese. In their place new industrial centres are arising in the south-west and north-west such as Chungking, Chêngtu, Kiating, Kunming, Kweiyang, Kweilin (until its occupation by the Japanese in 1944), Sian, and Lanchow. The south-west and north-west, which by no means comprise the whole of 'Free China,' have been selected for economic development because they are well away from the fighting zones, they are fairly rich in agricultural and mineral resources, and they are relatively easily accessible to Chungking.

Within these areas four industrial regions exist with potentialities for development, of which two, in the province of Szechwan, are already undergoing industrialization under Government encouragement. The first is situated in south-eastern Szechwan around Chungking; the second in south-western Szechwan, around Kiating (Loshan); the third in Yunnan, east of Kunming; and the fourth

in Kansu, around Lanchow. The major obstacles to the development of these industrial regions have been lack of transport facilities and industrial equipment.

(1) *South-eastern Szechwan*

This is based on two coal fields, one in the valley of Kialing kiang flowing southwards into the Yangtze at Chungking, the other in Nanchwan, south of Chungking, and on the Chikiang iron deposits in south-eastern Szechwan. The Kialing coal field, with an estimated reserve of 490,000,000 tons, is situated in the five *hsien* or counties (Pa, Kiangchin, Kiangpei, Hochow, and Pishan) around Chungking. The deposit is thicker than in most of the other coal fields in this province, and is, therefore, easier to mine, but owing to its high phosphorus content it is unsuitable for coking purposes without special treatment. Most of the pre-war production, about 500,000 tons, was consumed by Chungking. The need to increase production became urgent after 1938, when a large number of new factories were moved into the area. To attain this object the Government, besides adopting various measures to encourage production by small private operators, assisted the expansion of the Tienfu Company, one of the largest in the coal field, and brought about close co-operation between this concern and the Chungfu Administration (Pekin Syndicate). Equipment from the latter's coal mines in Honan was moved in to augment that of the Tienfu Company (Plate 30). The Nanchwan coal fields have an important advantage over the Kialing beds in that they are located nearer to the Chikiang iron reserves. Most of the coal reserve is bituminous and high in phosphorus content, but a deposit of 33,000,000 tons in the Wanshenchang field is of good quality and suitable for metallurgical purposes.

The Chikiang iron deposits are estimated at approximately 15,000,000 tons, and possess a high metallic content of around 54 per cent. At present these beds are worked chiefly with native handicraft equipment, and although the limitations of such methods are evident, the introduction of modern technique requires time as well as large investments of capital. To meet the emergency needs of war, the National Resources Commission is operating certain of these mines with modern equipment, and is at the same time encouraging those worked by handicraft methods to increase their production wherever possible.

The availability of coal and iron in adjacent districts is making this area the main centre of heavy industry for war-time China.

In outlining a plan for the future, a spokesman of the Ministry of Economic Affairs has suggested that an iron and steel plant should be established in the vicinity of the Wanshenchang field, which possesses the best of the Nanchwan deposits. In this case Chikiang ore could be brought to Wanshenchang for smelting, and the finished product would then be transported to Chungking or some other centre. If, on the other hand, coal from the Kialing field is to be used for smelting Chikiang iron, the location of the steel plant will have to be moved farther north, perhaps near Chungking, at the confluence of the Kialing and Yangtze rivers. Should a major coal and iron centre develop in this area it will be essential to construct a railway from Chikiang to Chungking. This would constitute a section of a Chungking–Canton railway, which is also necessary for the full economic development of the south-west. Such a railway would not only link Kialing coal with Chikiang iron, but would also connect Nanchwan coal and Chikiang iron with the important manufacturing centre around Chungking.

Chungking is naturally the centre of this industrial region. Situated at the intersection of the Yangtze and Kialing rivers and surrounded by coal fields, it is ideally placed from the point of view of transport and power facilities for the location of manufacturing industries. A sound basis for such a development has already been laid by the transfer of many factories from the coastal cities. As already stated Chungking has the largest concentration of factories in 'Free China.' In addition, a number of small-scale industries engaged in dyeing, tanning, weaving, food processing, and in the manufacture of pottery and matches are already established there; and the neighbouring villages produce such export commodities as tung-oil, bristles, silk yarn, and pharmaceutical goods. The establishment of a coal and iron centre would provide a powerful stimulus for manufacturing development at Chungking, just as the growth of this manufacturing area gives a strong impetus to the building of a coal and iron centre in south-eastern Szechwan. It seems probable, then, that the Chungking-Chikiang-Nanchwan triangle will become the base of the first key economic area in the whole western half of China.

(2) *South-western Szechwan*

The second potential industrial area is located around Kiating, south of Chêngtu, where the National Resources Commission is considering the possibility of carrying out an experiment in regional planned development comparable to the Tennessee Valley Authority

in the United States. The area, which covers nineteen *hsien* (Kiating, Kiakiang, Kienwei, Huangtan, Pingshan, Shihling, Yiping, Nanshi, Kiangan, Nachi, Luchow, Fushun, Kienlo, Neikiang, Chichung, Weiyuan, Junghsien, Opien, and the municipality of Tzechung), is well populated, and is already a centre for many industries such as sugar, salt, paper, silk, matches, pottery, and cotton.

Situated in the lower valley of the Min kiang and stretching across the valley of the Lu ho, which joins the Yangtze at Luchow, this area is well provided with water routes for transport. The main water routes are linked with the projected Szechwan-Yunnan railway at the intersection of the Min and Yangtze rivers at Sui. These lines of communication are being supplemented by a network of highways, with Luchow as the main transhipment centre. When these highways and railways are completed, Sui and Luchow will become the main transport centres of the south-west.

The potential power resources here consist of bituminous coal and hydro-electric energy. The second largest coal reserve in the south-west, next in importance to the Kialing-Nanchwan complex, is situated in the *hsien* of Kienwei, Kiating, Pingshan, Shihling, Huangtan, Weiyuan, Junghsien, and Luchow, and is usually known as the Kienwei field. Although this coal is of good coking quality, it cannot be used for metallurgical purposes without special treatment. The reserve amounts to 2,400,000,000 tons of low phosphorus content, but the annual production of 500,000 tons is far short of meeting the current demand, which has greatly increased as a result of the war-time expansion of local industries. In order to stimulate output, the Government has established an agency to regulate the production, transport, marketing, and pricing of coal for use in the salt industry. The Kiayang Coal Mining Company has also been organized by the National Resources Commission, jointly with the Chungfu Administration and other private bodies, for the large-scale exploitation of the coal reserves in the Kienwei field. In this way a basis for the solution of the power problem in this area seems to have been laid, but there are no statistics available to show how much coal production has increased.

There are great potentialities for the development of hydro-electric power in this region. The total water-power resources of Szechwan have been estimated at 4,600,000 h.p. The largest power site in the province is the Tung ho site, situated on the western margin of this area, with an estimated power reserve of 3,000,000 h.p. The potential power of this site, which is comparable in conception to that of the

Dnieper dam in the Ukraine, is indicated by the fact that the water drops approximately 80 ft. over a distance of 5 miles. These water-power resources cannot be exploited fully because of the large initial capital investment required and the difficulty of importing heavy and expensive equipment. The Government has, however, been able to set up a steam-turbine electric power plant, the Minkiang Electric Power House, with a planned maximum capacity of 10,000 kW, which is now able to supply the power requirements of the factories in the area.

The chief weakness of the Kiating industrial region is lack of extensive iron-ore deposits of any importance. There are about 80 handicraft foundries in Weiyuan *hsien* which use the small deposit of ore in the neighbourhood to make simple agricultural implements for local use. These resources are, however, insufficient to supply an iron and steel industry; but it is possible that such an industry based on the coal of Kiating and the ore of the Luku deposit, located 125 miles to the south-west in the district of Mienning in Sikang province, will develop in the future. Since there is no coal in the vicinity of the Luku deposit, the coal of Kiating seems to provide its natural complement. It has been suggested that the ore should be transported to Sui, where the iron and steel industry for the area should be located. At present the Luku deposit is inaccessible, but if a railway branching from the proposed Yunnan-Szechwan line can be built along the course of the Tung ho to connect the deposit with Wutungchaio or Sui, not only the Luku deposit but many other resources in this territory can be opened up. The Government's present plans, therefore, call for the development of the Kiating area as a light industrial centre without an iron and steel base, but when more capital resources become available it may rank among the most important centres of industry in China.

The lack of coal in south-western Szechwan is partly offset by the existence of rich resources of salt, sugar, paper, and silk, which provide the basis for many important chemical and other manufacturing industries. Especially since the loss of the coastal salt-producing districts much of the salt consumed in 'Free China' has been supplied by the salt wells of this region. The consumption of salt is likely to increase with the development of chemical industries. The foundation for such a development has been laid by the transfer of the Jungli Company and the Chiu Ta Company from North China to this part of Szechwan.

The Kiating area produces over one-third of the cane sugar of the

province, and one-sixth of the total production of all China. The three chief sugar-producing *hsien* (Chichung, Neikiang, and Fushun) have yielded an average of 700,000 tons of cane annually during recent years. But old methods of manufacture are used, and the average yearly production of sugar has been only 40,000 tons. It is estimated that the adoption of modern methods would increase this production to over 70,000 tons without any increase in the acreage under cane, and would go far to make the country self-sufficient in sugar requirements. The provincial authorities are now actively engaged in the promotion of the sugar industry, and have organized a cane-growing experimental station and set up a sugar factory.

The development of the sugar industry is desirable for another reason ; sugar molasses are an important raw material in the manufacture of alcohol. Until recently they were wasted, but the Szechwan Alcohol Factory has now been established in this area. From September to the end of December 1938 it produced 60,000 gallons of alcohol for fuel purposes, which, together with other vegetable oils, has contributed to the solution of the serious fuel problem.

The Kiating area also possesses the raw materials required for paper manufacture, and an abundance of technical talent for the making of paper by hand. The bamboo of Kiakiang and the waste products of the sugar cane can be used for paper-making, while the forests of the Tung ho valley provide raw materials for the manufacture of paper pulp. The handicraft paper-making industry, mostly concentrated in Kiating and Kiaking counties, now produces about 4,000 tons of paper, which is about one-fourth of the total production of the province. China is now more than ever dependent on the western producing areas, and given proper encouragement the prospects of expansion are good. Several modern style paper mills have now been established, and the authorities have also taken steps to improve the organization and increase the output of the small handicraft mills.

In addition to salt, sugar, and paper there are silk, match, pottery, and cotton textile factories, which can be enlarged and made more productive. The silk industry has a considerable importance. The silk produced, though small in amount, is of fine quality and provides raw materials for export commodities. Modern silk mills which were closed down during the slump of the silk trade after 1931 are now being reopened.

The south-western Szechwan industrial region has, therefore, undergone rapid development in the last few years. At the end of

1940 there were 57 factories using machine power and employing more than 30 workers. 19 located in Kiating, 11 in Weiyuan, 8 in Sui, 5 in Luchow, 3 each in Kienwei and Neikiang, 2 each in Nanshi and Tzechung, and 1 each in Chichung, Fushun, Kiangan, and Junghsien. There were 12 silk factories, 10 electric-power houses, 8 match factories, 8 iron foundries, 6 pottery shops, 3 silk-weaving establishments, 2 cotton textile mills, and 1 factory each for dyeing, paper-making, soda manufacturing, rice-flour milling, the making of cauldrons, alcoholic production, the treatment of coal, and the utilization of salt by-products.

(3) *Yunnan*

This area has not yet received the attention which has been given to Szechwan. Based primarily on Kunming, it produces tin and copper, and possesses coal reserves estimated at 167,000,000 tons. The coal deposit in Suanwei *hsien* in the north-east of the province contains about 46,000,000 tons, but it is inaccessible, and its exploitation will depend upon the development of transport facilities. The two coal fields most likely to undergo large-scale exploitation lie a short distance west of Kunming. One is in Yihiang *hsien* and contains about 17,000,000 tons; the other, the Kweishan field, located in the counties of Lohsi and Lonan contains about 35,000,000 tons. But the province appears to be poor in iron-ore, and there is no definite knowledge of extensive deposits. If an important iron and steel industry is to develop, Yunnan may have to draw upon the Luku deposit in Sikang for raw materials, but before this can be done a branch railway line linking Kunming with Mienning will have to be constructed. Should it be considered preferable to work Luku ore in combination with Kiating coal rather than Yunnan coal, then the development of heavy industry in Yunnan will depend upon whether substantial iron reserves can be found there.

The south-western parts of Yunnan have considerable mineral and agricultural resources, but industrial development in the future will largely depend upon the completion of the Yunnan-Burma railway. Though coal has been found in many districts through which the railway will pass, lignite and peat are more important, but with the exception of the peat deposit in Tengyueh, all deposits are too thin to be of much value. Bituminous coal is worked at Ipinlong and good quality anthracite has been discovered at Yunnani. There are limited amounts of iron-ore in Imen, Muting, Changning, Paoshan, and Tengyueh. The proposed railway would

also tap the so-called central Yunnan salt wells region in Yenhsing and Kwangtung districts. Not only can the output of salt itself be greatly increased, but the rock salt is also rich in saltpetre containing potassium nitrate, which can be used in making explosives, matches, and food preservatives.

The most promising industries based upon agricultural raw materials are flour milling and rape seed and linseed oil milling in the north, and sugar manufacturing and linen weaving in the south. Mulberry plantations and silk industries, tea plantations and tea-manufacturing, oil trees like the tung, and certain types of rubber and coffee are also possibilities. The climate in parts of southern Yunnan is ideal for growing mulberry trees to rear silkworms, and according to an experiment made by the Silkworm-rearing Improvement Institute the silks produced are even superior to those of Szechwan and Chekiang in both quality and quantity.

(4) *Kansu*

Perhaps because of its proximity to the theatre of military operations in North China very little attention has been paid to the establishment of a coal and iron centre in the north-west, where the chief interest at the present time is focused on petroleum. The Government has sponsored few projects of reconstruction in the area and had not shown much active interest in ascertaining the character and extent of its resources. There is a general atmosphere of inactivity, and very few people are promoting productive enterprises of any kind.

The geological formation of Kansu and Tsinghai indicates that they should contain considerable coal deposits, while there are stated to be large deposits of iron-ore in the neighbourhood of Lanchow. Coal deposits are reported to be especially large round Lanchow, near which magnesium resources are conveniently located. Provided transport facilities, particularly railways, can be extended, it seems that Lanchow will form the logical centre of industrial life in this area.

The Industrial Co-operative Movement

The Chinese Industrial Co-operative Movement (C.I.C.) was initiated in direct response to the destructive impact of Sino-Japanese hostilities upon the economic life in eastern China and the Yangtze. During the spring of 1938, after the industries of Shanghai and Tientsin had been largely destroyed or seized by the enemy, when

Plate 53. Chemical factory, Pukow, Kiangsu

The government-controlled Yung Lo Ammonia Plant near Nanking, producing synthetic nitrogen for the manufacture of sulphate of ammonia.

Plate 54. Potteries, Kingtechen, Kiangsi

Kingtechen potteries are over one thousand years old and have a wide reputation for porcelain of the best quality.

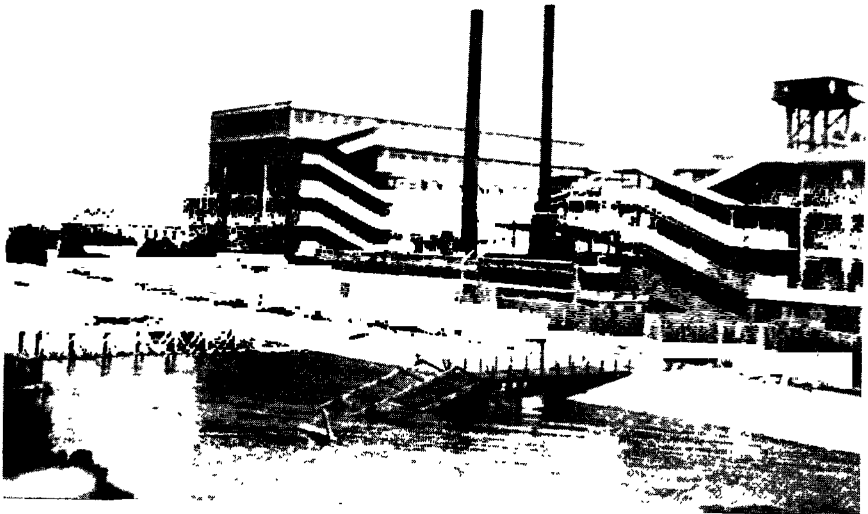

Plate 55. Egg products factory and refrigerating plant, Nanking
This factory, owned by the International Export Co., used to have a large direct export trade.

Plate 56. Chinese Industrial Co-operatives' factory, Shensi
One of the many small factories established by the C.I.C. throughout 'Free China.'

large numbers of destitute and homeless people were idling away their time in refugee camps, the idea of an industrial co-operative movement found increasing favour among a small number of Chinese and foreign enthusiasts. It was believed that such a movement could not only utilize this pool of labour, but could also induce the refugees to move into the hinterland and become self-conscious, self-supporting, and self-respecting citizens. The mission of the C.I.C. is, on the one hand, to build up economic resistance to aggression by the production of daily necessities for military and civilian requirements, and, on the other hand, to help in national reconstruction by the establishment of a sound co-operative basis for small industries scattered throughout China.

From the very beginning there has been widespread international interest in the C.I.C. Promotion committees were formed, first in Hong Kong, then in Manila, and later in the United States and Great Britain. In the United States, the C.I.C. Promotion Committee is a participating organization in the United China Relief, Inc., while in Britain plans are being made for a campaign to raise capital as well as money for equipment.

Growth and Distribution

The development of Indusco (as the C.I.C. is sometimes called) falls into three well-defined stages, namely the planning stage, then rapid expansion, and finally consolidation. After a preliminary period of preparation a plan was worked out and submitted to, and accepted by, the National Government. The new producers' movement was formally inaugurated in Hankow in August 1938 under the presidency of Dr H. H. Kung, who has long advocated the building up of China's light industry on a small and co-operative basis. Technical advice and assistance has been rendered by experts of different nationalities. These include Rewi Alley, a New Zealander, from the beginning chief adviser to the C.I.C.; Dr J. B. Tayler (English), co-operative expert of Yenching University and now head of the C.I.C. Central Training Institute in Chêngtu; Professor Louis Smythe and Charles H. Riggs of Nanking University, who have given help in training and experimental work; Professor E. R. Lapwood (English), statistical expert and inspector; and George Hogg of Oxford, head of the Paoki Baillie Technical School, and also C.I.C. inspector.

For purposes of planning the country has been divided into three zones of industrial co-operatives. The first zone, in the rear (Szech-

wan, Sikang, and Yunnan), is for the heavier industries which cannot be mobile and should be as far as possible from the battle line. In this zone the co-operatives are regarded as supplements to large-scale industry which is in process of being set up. The second zone stretches from Kansu in the north-west in a large arc round the fighting line to Fukien in South China. Here conditions are comparatively stable, but the danger of bombing means that industry must be as decentralized as possible. This is the main field of work for the C.I.C., which can if necessary provide a substitute for large-scale industry. The third zone of 'guerilla' industry is composed of front line districts and even areas behind the Japanese lines. In this zone Indusco is the only instrument of production in Chinese hands, and does much to strengthen the people's morale and cut down their dependence on Japanese goods. These co-operatives are smaller and have a higher degree of mobility than those in the other zones.

In accordance with the general plan a great effort was made to bring about the rapid expansion of the movement. By December 1939, a little over a year after the first unit, a blacksmith's co-operative, had been set up in Paoki in Shensi province, more than 1,000 societies had been organized. The rate of expansion was particularly high because of the urgent need to rescue tools and machinery from the threatened areas and to give refugees, especially skilled workers, productive employment. The following table shows the growth of the movement from December 1938 to June 1942.

Year	No. of Societies	No. of Members	Share Capital		Loans outstanding	Monthly Production
			Subscribed	Paid-up		
			$	$	$	$
1938	(Dec.) 69	1,149	16,292	10,206		
1939	(June) 724	9,534	163,188	91,842		
1939	(Dec.) 1,284	15,625	416,108	236,122	2,607,302	
1940	(June) 1,612	21,330	714,996	488,214	5,469,862	5,783,450
1940	(Dec.) 1,739	25,682	1,219,347	843,245	6,000,850	9,392,154
1941	(June) 1,867	29,284	1,835,793	1,357,858	12,520,365	14,246,595
1941	(Dec.) 1,737	23,088	2,348,084	1,972,204	13,893,045	14,478,892
1942	(June) 1,590	22,680	5,645,558	4,553,392	15,727,857	24,022,944

Source: Chinese Ministry of Information, *China Handbook* 1937–1943, p. 457 (New York, 1943).

At the end of June 1942 there were 1,590 industrial co-operatives with a total membership of 22,680 and a combined monthly output of about $24,000,000 in value. Since June 1941 expansion has slowed down as a result of a deliberate policy of consolidation which is believed to be necessary before another big advance can be made. Unforeseen difficulties, the most serious of which are shortage of operating capital and soaring prices, have made this course necessary. During the phase of consolidation many co-operatives have been reorganized or combined in an attempt to improve quality and productive efficiency, while in a few cases societies failing to reach a desired standard have been dissolved.

The main concentrations are found in Szechwan, and in the north-west and south-east. The societies of Szechwan are most numerous around Chungking and Chêngtu, but many are now being formed in the highlands west of Chêngtu and in the neighbouring province of Sikang, where there is gold and wool. In the north-west co-operatives are well developed in the neighbourhood of Paoki, the regional centre, and the federation system of marketing and supply is working successfully. Notable progress has also been made in the front-line provinces of Shansi, Honan, Chekiang, and Anhwei. Nearly 200 co-operatives have been established, and although they are on a mobile or semi-mobile basis, they have provided work for refugees who are fleeing from the enemy (Plate 56).

Organization

The direction of the C.I.C. is invested in 86 depots which are scattered in different parts of 'Free China.' These depots are divided among seven regions: the north-west (Shensi, Kansu, Ninghsia, Tsinghai); Chwan-kang (Szechwan, Sikang); the south-east (Kiangsi, Kwangtung, Fukien); the south-west (Hunan, Kwangsi); Tien-Chien (Yunnan, Kweichow); Tsin-Yu (Shansi, Honan, Hupeh); Che-Wan (Chekiang, Anhwei). These depots are responsible to the seven regional headquarters (located in Paoki, Chungking, Kanhsien, Kweilin, Kunming, Loyang, and Kinhwa respectively), which in turn are responsible to the central headquarters in Chungking.

To form a society at least seven persons of adequate technical training and skill are required. After a discussion they must draw up a plan, which has to be submitted to the C.I.C. depot in that locality. When the plan has been accepted and the unit registered by the C.I.C., it may then apply for all possible assistance—financial,

Classification of C.I.C. by Industries (June 1942)

Industries	Number of Co-operatives									No. of Members	Loans outstanding	Monthly Production
	North-west	Chwan-kang	South-east	South-west	Tien-Chien	Tsin-Yu	Che-Wan	Total	Percentage		$	$
Machine and Metal Works	12	7	20	6	4	3	5	57	3·6	1,011	1,600,786	1,458,340
Mining . .	73	8	21	1	..	8	..	111	7·1	972	196,836	42,883
Textile . . .	101	141	44	142	97	45	14	584	36·7	10,449	5,233,985	12,157,056
Tailoring . .	32	20	35	22	15	23	12	159	10·0	1,718	81,209,852	2,768,038
Chemical . .	40	46	160	31	13	22	10	322	20·2	4,494	4,083,906	3,310,663
Foodstuff . .	15	6	25	5	7	9	3	70	4·4	707	610,965	1,008,249
Stationery Supplies . .	7	6	17	1	4	6	2	43	2·7	749	929,090	901,431
Carpentry and Masonry	22	5	63	8	4	1	3	106	6·7	1,090	589,739	453,744
Transportation	2	..	2	3	..	..	..	7	0·4	67	46,750	15,400
Miscellaneous .	21	8	46	27	14	1	14	131	8·2	1,423	1,225,948	1,907,140
Total . .	325	247	433	246	158	118	63	1,590	..	22,680	15,727,857	24,022,944
Percentage . .	20·4	15·6	27·2	15·5	9·9	7·5	4·0	..	100·0	..	..	..

Source: Chinese Ministry of Information, *China Handbook* 1937–1943, p. 458 (New York, 1943).

technical, or otherwise. If the co-operative in question requires a loan the depot may extend it out of C.I.C. funds or introduce the co-operative to a bank, in which case the C.I.C.'s guarantee is usually required. No guarantee is demanded from the co-operative for the money, but it is usually explained that the members are collectively responsible for the loan capital.

Machinery is bought or built, workshops acquired, and materials secured for cash or credit. Goods produced are at first sold in front of the workshop, but when there are several units in a town a union co-operative marketing system is used. The accounts are kept by C.I.C. representatives, and profits are divided at the end of the year according to the constitution, usually as follows: reserves, 20–30 per cent.; contribution to C.I.C., 10 per cent.; bonus to staff, 10 per cent.; common good fund, 10 per cent.; dividend to members and workers, 40–50 per cent.

Throughout the system officers are elected, and wages and duties fixed by meetings of members and committees chosen by them. The relation of the C.I.C. depot to the local unit is one of general supervision, direction, and advice. In this respect modern technique and machines are introduced when the opportunity arises, and there is a drive, which is becoming stronger, for the improvement of quality and standardization. After a time the societies at each depot are federated, and the federation organizes supply and marketing with the help of the C.I.C. It is intended through local federations, then regional federations, and finally a national federation, that the co-operative industries throughout the country will be linked together to make a continuous and integral whole.

Types of Production

The co-operative societies are engaged in the manufacture of over 100 different types of goods, which may be broadly classified as follows: machine and metal working, mining, textile, chemical, foodstuffs, transport, and miscellaneous. Of these the textile co-operatives, which have to meet large Government demands for army equipment, form the highest proportion, embracing over one-third of the total number of societies. Textile units have been established to weave, spin, knit, to make towels, absorbent cotton, gauze, and to do tailoring. Usually the scale of the individual unit is small, but the combined output is important. In 1940, for example, surgical cotton co-operatives in Paoki achieved a monthly output of 16,000 pounds, and those in Hsiaoyang (Hunan) over 10,000 pounds.

Many of the co-operatives are producing blankets to meet both military and civilian needs. Altogether the C.I.C. has manufactured 3,000,000 army blankets for the Ministry of War.

Mining and machine co-operatives are also growing in importance. In May 1940 there were 15 machine shop co-operatives engaged in making spinning wheels, looms, and lathes, and machinery needed in small-scale industry. Three units in Yungyang (Szechwan) had a monthly output of 100 tons of pig iron. A unit in Fung (Shensi) has constructed a water-power station generating 20 h.p., which is able to produce each year 1,500 spinning wheels, 1,500 weaving looms, 1,000 wagons with rubber-tyred wooden wheels, 300 noodle machines, 100 printing machines, and also additional spare parts. Co-operatives have also been established in the following: tanning, sugar refining, rice and flour milling, the manufacture of cigarettes, pens, soap, tooth-brushes, and furniture. These facts illustrate the variety and extent of industrial co-operative activity.

Besides the special role they play in industrial production, the co-operatives have a great educational value in teaching the people co-operation and skill, and in helping to solve difficulties for individual members and for the masses as a whole. Every C.I.C. supports programmes of general and co-operative education, and in some regions young people between 12 and 16 are recruited and specially trained as technicians. A noteworthy type of co-operative effort are the wounded soldiers' societies, quite numerous in Kiangsi, which provide members with a trade together with a sense of security. It is considered that they will increase in importance in the future, since they point to a way in which large numbers of Chinese veteran soldiers can be rehabilitated and put into civilian life again when the war is over.

The Industrial Outlook

From the preceding survey certain conclusions can now be drawn relating to the probable trends and forms of organization of post-war industrialization. China's resources for industrial development, although less abundant than those of the U.S.A. or the U.S.S.R., are nevertheless sufficient to support a moderate programme of industrialization for a long period. Her labour resources, given sufficient training in skill and discipline, are unlimited. On the other hand China lacks capital and managerial and technical personnel and will have to import these from the advanced industrial nations, particularly from the United States and Great Britain. Her ability

to industrialize, even under the most difficult war-time conditions, has been reasonably proved by the remarkable achievements of 'Free China' in the three fields of agriculture, industry, and transport.

Views of Chinese Economists

Leading Chinese economists have tentatively suggested that the following principles should be used as a guide in post-war industrialization. Firstly, the two world wars have shown the futility of isolation for any country in an age which, because of scientific progress and the improvement in the means of transport and communication, has brought all nations closer together than ever before. An undeveloped China, with its rich natural resources and abundant man-power, would be a continual invitation to international conflict over her control. That this is so has been well proved by the imperialistic rivalry in the Far East during the last hundred years. In the future China will not rest content with the role assigned by Japan or any other nation with similar intentions, that she should remain an agricultural country at the mercy of the industrial Powers.

In the second place, international collaboration must take the place of international rivalry in the development of China's resources. Chinese industrialization must be so worked out as to lessen the maladjustments in international economic development which have contributed in no small measure to the outbreak of the two world wars. Economic organization in the modern world has advanced ahead of political organization, and the problem in the Far East, as in Europe, will be to prevent a premature political settlement obstructing the most appropriate lines of economic development. China will have to find her proper place in the world economy, especially in the economy of south-eastern Asia. One Chinese economist suggests that China, Japan, India, and some federation or 'Indonesian Union,' comprising French Indo-China, British Malaya, Siam, Burma, Netherlands East Indies, and the Philippines might be brought within the orbit of this south-eastern Asiatic economy.[1]

Thirdly, foreign investments will be welcome for post-war industrialization on the basis of equal treatment and with no infringement of China's sovereignty. They will be used for the purchase

[1] Fong, H. D., *The Post-War Industrialization of China*, p. 77 (Washington, 1942).

of capital goods as well as for the employment of foreign technical and managerial personnel in which China is at present deficient. These loans should carry low interest rates, say 3 per cent. to 5 per cent., for a minimum period of ten or more years, in order to facilitate and assure their repayment. Where advisable, trade agreements should be arranged providing for repayment in terms of goods in the production of which China possesses distinct advantages. Chinese leaders are determined to have an economy in which industry is balanced with agriculture, and T. V. Soong declared in August 1943 that, if foreign capital was not forthcoming on reasonable terms, his Government would not shrink from denying the people consumer goods for the time being in order that they could have their industries.

Lastly, a comprehensive survey of China's resources must be carried out if their rational and effective use is to be the primary concern. A beginning was made when the Central Planning Bureau, organized in the spring of 1941, drafted a Three Year Programme for War-time Reconstruction for the period 1942–44. Another important step was the holding of a Post-War Industrial Reconstruction Planning Conference under the auspices of the Ministry of Economic Affairs in 1943. But an international resources survey, carried out by Chinese and foreign experts, would go a long way to ascertain the fundamental facts of China's resources, and thus provide a sound basis for post-war development schemes.

Location of Industry

The concentration of her industrial centres along the eastern seaboard in 1937 made China's economic life unusually vulnerable to Japanese aggression. The loss of the majority of these centres in the early months of the war made a deep impression on the nation's leaders, and they are resolved that, when peace comes, every effort shall be made to locate industries with due consideration to the requirements of national defence as well as to the sources of raw materials and fuel supplies. For these reasons some of the new industrial centres which have grown up in 'Free China' will occupy prominent places in the post-war programme. But in view of the fact that eastern China, especially the lower Yangtze valley, still enjoys advantages over the west in geographical location, transport facilities, and the general level of economic development, it is natural to expect that when the war ends there will be a strong tendency to move to the coast.

It seems likely that the Chinese government will plan for the establishment of further development of seven major industrial regions in the post-war period. These will probably be located in southern Manchuria, Shansi and western Hopeh, the Yangtze delta, Hunan and Hupeh, the Canton delta, south-west China with its main centre in south-eastern Szechwan, and north-west China based on Lanchow. Southern Manchuria will be the main centre of heavy industry in North China, and south-eastern Szechwan in West China.

Organization of Industry

The principal aim of China's economic reconstruction will be to build up a modern planned economy adequate to meet the needs of national defence and to promote the material well-being of the people as a whole. No single form of economic organization will adequately meet these needs, and different sections of China's post-war economy will require different forms of organization. Thus industries closely connected with national defence, especially heavy industries and those of a monopolistic character will be owned and operated by the Government for several reasons. They require a large capital investment which private enterprise in China will not be in a position to provide for a long time. They are usually risky and financially unattractive; yet they are vital to the needs of national defence, and cannot be left to develop in an uncontrolled manner under conditions of free competition.

Light industries, on the other hand, may well be developed by private capital, both foreign and Chinese. These industries, which alone flourished to reasonable extent before the Sino-Japanese war, will continue to expand under private enterprise, but with State regulation controlling working conditions and related matters. In this connection it is emphasized by official spokesmen that, in spite of the increase of State control during the war, government enterprise is intended only to supplement private enterprise, and not to bring about the nationalization of the economic system as a whole. State ownership and private enterprise will each have a role to play in the huge task of industrialization.

The most important section of China's post-war economy, whether agricultural or industrial, will probably be organized along co-operative lines. Approximately four-fifths of the country's industrial production are derived from small-scale industries carried on by farmers in their off-seasons or by urban craftsmen in small workshops.

For this form of decentralization small-scale production co-operation appears to provide the best hope for improvement. It does not interfere unduly with the mode of production, yet affords peasants and craftsmen alike the advantages of large-scale purchasing, financing, and marketing. It also affords the best hope of preserving the fine tradition of Chinese craftsmanship.

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Chapter V

FOREIGN TRADE

Historical Background: Commercial Policy: Balance of Trade: Balance of Payments: Import Trade: Export Trade: Direction of Trade: War-time Developments, 1937–44: Bibliographical Note.

China's foreign commerce is not highly developed, and her share of world trade has never been very large. In 1938, for example, China, with approximately a fifth of the world's population, accounted for only one-fiftieth of its foreign trade. With ten times the population her foreign trade was less than one-sixth of that of the United Kingdom, though it has to be remembered that there are wide differences in the wealth and the standards of living of the two countries. China's population is five or six times that of Japan, but her foreign trade was less than two-thirds. Compared with China, however, Japan is a highly industrialized country. India is more suitable for purposes of comparison, since it presents a greater similarity of conditions. Here, although China's population is much larger, her foreign trade was 20 per cent. less.

Historical Background

Prior to the nineteenth century China was almost self-sufficient, and foreign trade was largely confined to luxuries. Caravans made their way along the trade routes of Central Asia, carrying silk, porcelain, lacquer, and similar artistic products to the markets of Europe. Maritime contacts with the West were not important, though as early as A.D. 300 the Arabs had a settlement at Canton and acted as intermediaries between Chinese merchants, who rarely ventured west of Aden and seldom beyond Singapore, and the Greeks, who did not sail east of Ceylon (see vol. ii, pp. 4–6).

The first direct trade with Europe was established by the Portuguese, who founded a colony at Macao in 1557 (see vol. ii, p. 341). Other foreign merchants came at various times to share the trade and settled in Canton, which became the centre of petty trading posts for Spanish, Dutch, English, and French adventurers. The Russians came to trade with China in 1658, but the Americans did not arrive until 1784.

For a long time the Chinese showed little interest in foreign goods, and foreign trade consisted largely of exports. This lack of interest was due in part to the geographical isolation of China and in part to the temperament of the Chinese people, who believed their civilization superior to any other and that the rest of the world had nothing of value to sell them in return for the tea, silk, porcelain, and other fine things that they themselves could produce. In order to pay for their purchases in the early days, foreign countries had to ship large amounts of silver to China, a course which was contrary to the economic doctrines of the time. Moreover, the Chinese officials were reluctant to cede the trading facilities requested by the Western Powers, and some (but by no means all, for there were divided councils as to whether control or prohibition was preferable) tried to crush the sale of opium, the one thing for which there was an effective demand in China. This state of affairs culminated in the so-called 'Opium' war (1839–42), which was actually fought to open China to foreign trade on reasonable terms. The British were victorious, and gained for themselves and other nations many important rights, including treaty port facilities and extraterritorial rights. After that the foreign trade of China expanded rapidly, both in character and in volume. In the second half of the nineteenth century imports became more significant, and most years showed an excess of visible purchases over sales.

Commercial Policy

Up to 1834 China had full authority in prescribing the terms on which foreign trade was to be conducted, but under the Treaty of Nanking (1842), signed with Great Britain after the 'Opium' war, she lost the right of tariff autonomy. The treaty stipulated that a fair and regular tariff should be provided, which might not be altered except with the consent of both parties. In 1843 a further agreement was made with Great Britain laying down tariff and general trade regulations and amplifying the basic rights contained in the previous treaty. In the following year the United States, by the Treaty of Wanghsia, obtained all the special rights granted to Great Britain. Later treaties with France, Sweden, and Norway were modelled on the American treaty. Thereafter, all European countries, one by one, signed treaties with China under which they secured substantially the same fiscal provisions as the British treaty, restricting China to a fixed schedule of 5 per cent. *ad valorem* import

and export duties. Most of these early agreements included a most-favoured-nation clause whereby any additional privilege granted to a foreign country was automatically extended to all other countries having this clause in their treaty with China.

The treaty provisions conferred many benefits upon the foreign powers, and from time to time they were further modified in their favour. In 1857 prices began to drop, and the 5 per cent. duty was considered by the Powers to be in excess of the prescribed 5 per cent. limit. At their request the schedules were accordingly revised downwards in the following years. After 1858, however, prices began to mount, but there was no compensating revision of the tariff until forty-four years later, in 1902. Even then the tariff rates were raised on the basis of the average prices of 1897–99, while those prevailing in 1901, the year immediately preceding the revision, were not taken into account.

Tariff Revision

In 1912 China made the first serious effort to revise the tariff in order to meet increased government expenses and to bring it into line with actual prices. The attempt failed because among the sixteen nations concerned, Italy, Russia, and Japan withheld consent. Six years later, however, partly as a reward for China's services during the war of 1914–18, the Allies agreed to her demand for an upward revision of the tariff schedules to an effective 5 per cent. based on the current, instead of 1858 prices. This agreement was subsequently modified, and the revision, as made by an international commission, yielded only $3\frac{1}{2}$ per cent. instead of the promised 5 per cent.

The Washington Conference (1922) called for another revision and suggested that a special conference should be held in China to consider the whole tariff problem. The revision of the schedule was made, but the special tariff conference was not convened until 1925. This, the Peking Conference, lasted nine months, but there was little to show for this long sitting. Its one accomplishment was the adoption of a resolution recognizing as a principle China's right to tariff autonomy, but the question as to when she might exercise that right remained undecided.

The movement for tariff autonomy gathered force after 1925, and was part of the widespread revolt against the so-called 'unequal treaties.' China demanded equality and reciprocity so far as import and export duties were concerned, and she stated her case very

clearly. Firstly, she wanted tariff autonomy because she needed money and hoped to increase revenue from this source. Secondly, she considered that tariff autonomy was something that was rightly hers, and not something to be granted by, or asked of, others. Finally, with a growing unemployment problem, she needed tariffs to develop her own industries. On the other hand, the general reason for withholding tariff autonomy and other privileges from China was that conditions in the country were such that the foreign powers could not relinquish such rights with justice to China and safety to themselves. Whether they were justified in this view or not the delay in granting tariff autonomy led the Chinese to question the sincerity of the foreign powers in all their dealings with China.

A further opportunity for China to press her case came from the fact that a number of the old treaties were about to expire or were due for revision. It was clear that China would insist on replacing or revising the old treaties, some of which were worded in such obsolete phraseology as to make them practically perpetual. In 1926, for example, China requested a revision of her treaties with Belgium and Japan on the basis of equality and reciprocity. Protracted negotiations were carried on with both countries, but in neither case was it possible to find a common formula for agreement.

Tariff Autonomy

The state of deadlock between China and the foreign powers was suddenly broken by the conclusion of the Sino-American Treaty on 25 July 1928. The United States recognized China's full right to tariff autonomy, and agreed that China should henceforth have the right to raise the tariff above the 5 per cent. limit against American goods as soon as the other treaty powers with similar rights against China should come to a like agreement. Then most significantly Great Britain, the first nation to obtain special privileges from China, signed a tariff-autonomy treaty. Italy, Holland, France, Denmark, Norway, Sweden, and Belgium followed suit, and by December 1928 all the treaty powers, with the exception of Japan, had made new agreements.

China issued her new tariff schedules, which were to become effective on 1 February 1929. The new tariff did not call for a high import duty, but laid down an average of 18 per cent. Even to the last day it was not certain whether the new tariff would be applied

because Japan refused to recognize it by retaining the Chinese letter of notification. However, on the eve of the day in question, the Japanese consul at Nanking notified the Chinese government of Japan's acceptance.

Commercial Policy, 1929–36

China's foreign trade policy under the National Government, and prior to the Sino-Japanese war, was to encourage home industries and develop exports. With regard to domestic industries tariff protection was given, with the result that in many lines it became possible to sell Chinese-made goods of fair average quality at prices considerably below those of the imported article. It was hoped that as Chinese manufacturers acquired more experience and became more efficient, there would be an increase in productivity and a decrease in costs, and that the home industries would thus gradually grow up to strength and maturity.

To bring about the desired expansion in the export trade the government set out to promote an active interest in this branch of commerce. One of the most important steps was the establishment of the Bureau of Foreign Trade, corresponding to the Department of Overseas Trade in Great Britain, or the Bureau of Domestic and Foreign Commerce in the Department of Commerce in the United States. The government also appointed commercial attaches, or trade commissioners, who were stationed in the principal financial and commercial centres of the world. Chinese business men formed a Foreign Trade Commission, with headquarters in Shanghai, and branches were opened in all leading commercial centres in the country. A China International Committee of the International Chamber of Commerce was also organized, with the idea of promoting international economic co-operation and encouraging friendly intercourse between business men of all nations.

Balance of Trade

Since 1880 an adverse balance of trade, *i.e.* an excess of visible imports over visible exports, has been no unusual occurrence in China (Fig. 34). In 1936 the total value of Chinese imports was \$941 million, against an export value of \$706 million, thus showing a visible adverse balance of trade of \$235 million. The following table shows the relation in value between the imports and exports of China (excluding Manchuria) since 1927.

Year	Imports	Exports	Excess of imports over exports
	million $	million $	million $
1927	1,298	980	318
1928	1,530	1,047	483
1929	1,620	1,070	550
1930	1,733	944	779
1931	2,002	915	1,087
1932	1,524	569	955
1933	1,345	612	733
1934	1,030	535	495
1935	919	576	343
1936	941	706	235

Source: The Maritime Customs, *The Trade of China*, 1936, p. 54 (Shanghai, 1937).

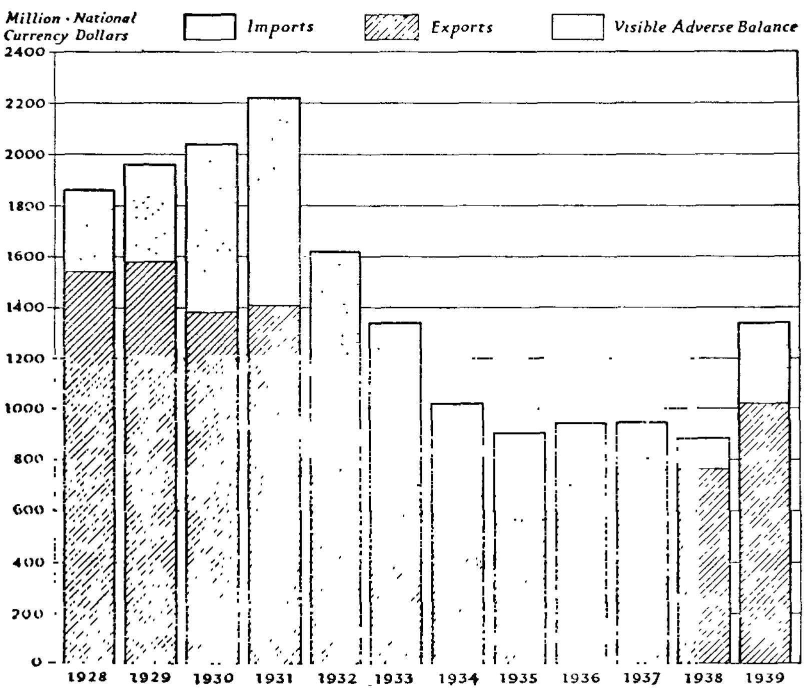

Fig. 34. Imports, exports, and balance of trade, 1928–39

Based on statistics in *Statistical Abstract of the Republic of China*, 1940, p. 93 (Chungking, 1940).

The effect of the Japanese occupation of Manchuria and the Shanghai hostilities (1931–32) is apparent, but the depreciation in the Chinese dollar masks the trade decline following the outbreak of the Sino-Japanese war in 1937 (see p. 188); in 1939 the adverse balance in sterling was about eight times that of 1937.

A striking feature of this table is the reduction in the adverse visible balance of trade during the last five years from $1,087 million in 1931 to $235 million in 1936. The decline in the import trade, due in part to the heavy incidence of customs duties and increased smuggling, but mainly to local factory production and to depressed conditions in China, was arrested in 1936, in which year there were signs of a recovery. Increased demand in the world's markets for China's products, particularly wood-oil, coincided with excellent crops in 1936, and these factors largely account for the increase of the export trade of that year.

Balance of Payments

An adverse balance of trade, as already stated, has been a normal phenomenon of China's trade for a great many years (see p. 168). With unimportant exceptions, however, China imported silver on balance each year until 1931. It can be safely assumed, therefore, that up to that time at least, the adverse balance of trade must have been more than offset by invisible exports. From 1932 onwards China was a constant exporter of silver (see p. 202), but as the silver standard was abandoned on 3 November 1935, it does not follow that silver exported since that date automatically assisted in balancing the visible trade position.

Under normal conditions it is always a matter of some difficulty to estimate accurately just how the balance of payments in any one year is achieved. The following is a statement of the balance of payments in 1936 of China (excluding Manchuria and Jehol), as estimated by the Bank of China:

Balance of Payments, 1936 (*millions of dollars*)

	Merchandise	Interest and dividends	Other services	Gold	Total	Known capital items	All items
Credit ..	1,105·9	90 0	480·0	48·1	1,724 0	60·0	1,784·0
Debit ..	1,146·2	197·8	12·0	2·5	1,358 5	..	1,358·5
Balance ..	−40·2	−107·8	+468·0	+45·6	+365·5	+60	+425·5

Source: League of Nations, *Balance of Payments*, 1936, p. 80 (Geneva, 1937).

The chief source of invisible gain was remittances from Chinese residents overseas, estimated at about $320 million in 1936, as compared with $280 million in 1935. This increase was attributed in part to the low level of the exchange and the reviving confidence abroad in the stability of the Chinese dollar, and in part to the improvement in business conditions in those countries, particularly British Malaya and the Netherlands East Indies, where the majority of the Chinese emigrants lived.

Apart from emigrants' remittances, the largest remaining item of income was the expenditure in China by foreign legations, garrisons, naval ships, merchant vessels, schools, missions, tourists, and students, which was estimated at $160 million in 1936. Corresponding expenditure by Chinese legations, tourists, and students abroad amounted to $12 million annually.

Under the conditions which have prevailed in China since the outbreak of war any estimate of the balance of payments is difficult, if not impossible. The following, however, are figures for the estimated balance of payments for the year 1938, compiled by E. Kann in 1939, and taken from the pages of *Finance and Commerce* (Shanghai):

Balance of Payments, 1938 (*thousands of dollars*)

In Payments		
(1) Export of Merchandise from China		$762,641
(2) Adjustment of Export Values		60,000
(3) Export of Treasure		
(*a*) Gold	(net import)	
(*b*) Silver	$80,329	
(*c*) Gold smuggled	15,000	
(*d*) Silver smuggled	20,000	
		115,329
(4) Remittances from emigrants abroad		600,000
(5) *Miscellaneous Foreign Expenditure*—		
(*a*) Foreign Missions, etc.	$60,000	
(*b*) Military and Naval	180,000	
(*c*) Diplomatic and Consular	25,000	
(*d*) Shipping dues, etc.	20,000	
(*e*) Tourists	2,000	
		287,000
(6) Foreign Security Yields		15,000
		$1,839,970

Out Payments—

(7)	Imports of Merchandise into China		$886,200
(8)	Adjustment of Import Values		170,000
(9)	Import of Gold (net)		14,083
(10)	Smuggling of Goods into China		200,000
(11)	*Cost of Foreign Loan Services—*		
	(*a*) Secured on Customs Revenue	$77,959	
	(*b*) Wheat and Cotton Loans	10,123	
	(*c*) Secured on Salt Revenue	18,805	
	(*d*) Railway Loans	9,800	
			116,687
(12)	Chinese Legations, Students, Travellers		13,000
(13)	Payments to Foreigners for Insurance Freight and Charterage of Ships		20,000
(14)	Silver shipped abroad but unsold		200,000
(15)	War expenditure abroad, less credits		150,000
(16)	Withdrawals and Flight of Capital		70,000
			$1,839,970

A few remarks regarding the remittances from Chinese abroad may be of interest. At $600,000,000 these remittances show a progressive increase over the figures for 1935, 1936, and 1937, which were estimated to be $280,000,000, $320,000,000, and $450,000,000 respectively. The increase, which continued after 1938 according to later information, is accounted for by appeals to Chinese abroad on the part of the Chinese government to support the war, by the increased prosperity enjoyed by Chinese in Malaya, the Netherlands East Indies, and elsewhere, until the outbreak of the Pacific war, and by the increasingly favourable rate of exchange for such remittances, due to the depreciation of the Chinese national dollar. During 1941 exchange control regulations introduced into Malaya and the Netherlands East Indies reduced remittances to China from Chinese in these countries, and the Japanese occupation of south-east Asia put an end to these remittances to Chinese in 'Free China' for the time being, although no doubt remittances from Chinese in the United States, and other countries not under the domination of either Germany or Japan, still find their way to Chungking in considerable volume.

Import Trade

Until the outbreak of the Sino-Japanese war China was primarily an importer of industrial goods which normally accounted for well

over 50 per cent. of her total purchases from abroad. The preparation of these goods involved special technique, large-scale production of raw materials which were not readily available in China. Classified by their nature, manufactured goods were the most voluminous, raw materials and semi-manufactured goods next, and food, drink, and tobacco last. This order was rarely modified except in a few years when large increases in the import of rice and wheat placed the position of food, drink, and tobacco ahead of that of raw materials and semi-manufactured goods. During 1936 manufactured goods retained the foremost place with the percentage of total imports, rising from 50 per cent. in 1935 to 56 per cent.; food, drink, and tobacco fell to third place because of the good harvest, and raw materials and semi-manufactured goods took second place (Fig. 35).

The following table gives comparative statistics for the value of the import trade during the three years 1934, 1935, and 1936:

Imports by Commodities, 1934–36 (*dollars*)

	1934	1935	1936
Metals and ores	98,884,321	87,442,948	108,055,485
Candles, soap, oils, fats, waxes, gums, and resins	109,216,988	101,696,701	105,132,577
Machinery and tools	59,306,338	65,853,248	59,980,614
Books, maps, paper, and wood pulp.. ..	49,552,757	53,124,800	57,467,152
Cotton and manufactures thereof	126,002,764	68,679,626	54,360,056
Vehicles and vessels	36,961,442	30,584,591	52,483,640
Chemicals and pharmaceuticals	41,594,484	37,443,182	51,839,815
Cereals and flour	111,743,137	135,917,318	49,219,653
Miscellaneous metal manufactures	53,843,107	34,805,947	46,712,322
Dyes, pigments, paints, and varnishes ..	38,872,690	37,611,774	41,193,099
Wool and manufactures thereof	35,927,735	20,411,974	29,310,711
Timber	34,152,278	34,768,106	28,910,762
Sugar	32,686,379	27,672,906	20,534,761
Flax, ramie, hemp, jute, and manufactures thereof	11,507,014	13,167,762	17,986,704
Fishery and sea products	18,211,519	19,028,281	17,793,232
Tobacco	34,016,399	11,300,883	17,389,337
Animal products, canned goods, and groceries	13,595,103	11,778,208	9,370,701
Silk (including artificial silk) and manufactures thereof	7,567,833	8,046,105	9,370,699
Medicinal substances and spices	9,016,583	8,689,249	8,729,825
Wood, bamboos, rattans, coir, straw, and manufactures thereof	10,168,331	7,541,582	7,622,031
Coal, fuel, pitch, and tar	12,135,260	9,199,084	7,449,731
Fruits, seeds, and vegetables	7,328,868	6,948,743	5,821,783
Chinaware, enamelled ware, glass, etc. ..	6,913,367	5,762,369	4,803,674
Hides, leather, and other animal substances	6,099,516	4,530,345	4,778,499
Stone, earth, and manufactures thereof ..	5,517,352	4,736,125	3,697,706
Wines, beer, spirits, table waters, etc. ..	3,228,651	2,965,108	1,603,112
General sundry list	55,615,008	69,504,357	119,927,057
Total	1,029,665,224	919,211,322	941,544,738

Source: The Maritime Customs, *The Trade of China*, 1936, p. 57 (Shanghai, 1937).

Cotton Goods

Cotton cloth and yarn headed the list of imports for many years with first the United Kingdom and then Japan furnishing the chief supply. The quality of imported cloth though low was somewhat above that produced in China. This continued until 1930 when cotton piece goods, including yarn, thread, and sundry cotton manufactures, but excluding raw cotton and waste, led all other imports with a value of $233·4 million. Since then there has been a rapid decline, as is evidenced by the following figures showing the remarkable value statistic in pre-war years: 1931 $188·6 million, 1932 $139·8 million, 1933 $71·3 million, 1934 $35·8 million, 1935 $27·7 million, 1936 $18·3 million. This has been caused partly by the restriction of purchasing power in China, but mainly by the growth of the cotton industry, a development which has been hastened by a higher customs tariff.

Raw Cotton

As recently as 1931 China imported 2·9 million quintals of raw cotton valued at $279 million; imports subsequently declined, however, to 1·1 million quintals in 1934, and 0·4 million quintals valued at $36 million in 1936. British India was by far the largest importer, followed by the United States and Egypt. These figures indicate that China had become practically self-sufficient in regard to supplies of raw cotton by 1936, imports from abroad being confined to specialities.

Wool

One of the most striking features of the import trade has been the development of the trade in wool, which prior to the war constituted one of China's leading imports. This is a result of the increasing popularity of woollen fabrics and materials for clothing purposes. In 1936 China imported $29·3 million, of which the United Kingdom supplied over a half and Japan a third. The United Kingdom trade was mainly in carded and combed work, while Japan had become the principal supplier of woollen manufactures.

Metals and Ores

As will be seen, metals and ores headed the list of imports according to value in the years before the war, accounting for over 11 per

cent. of the total. As against 1935 there was an increase from $87 million to $108 million in 1936. The most important increases occurred in ungalvanized iron and steel bars, in sheets and plates and tinned plates, with a decline in the value of rails and structural materials. The principal share in this trade during 1936 was taken by Germany with a value amounting to $23·2 million, followed by Japan with $21·5 million, the United Kingdom with $19·8 million, and the United States with $16·8 million. The increased consumption of metals and ores was due to the fact that manufacturing

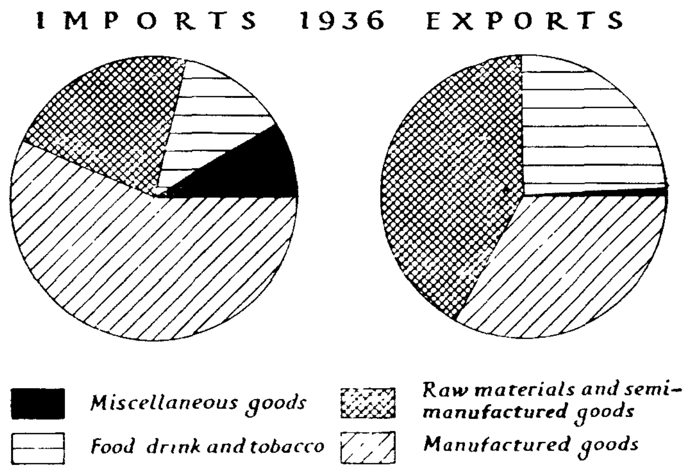

Fig. 35. Imports and exports by nature, 1936

Based on statistics in *Chinese Economic Journal and Bulletin*, vol. xx, pp. 503–4 (Shanghai, 1937).

China is primarily an importer of manufactured goods and an exporter of raw materials and semi-manufactured goods, but the export of manufactured goods has risen steadily with industrial development.

and reconstruction work in connexion with railways and roads on the part of the government was proceeding with greater rapidity than in previous years.

Machinery and Electrical Materials

Imports under this heading annually averaged $60 million in value in the years prior to the war. In 1936 the principal importing countries were Japan with purchases valued at $16·8 million, Germany $12·7 million, the United Kingdom $11·4 million, and the United States $7·1 million. The most important item in this category

was textile machinery, the value of importations being approximately $14 million, of which the United Kingdom supplied 13 per cent. and Japan 81 per cent. While much of the increased share of this important trade secured by Japan was for Japanese mills in China, Japan's ability to sell at low prices, and an increased willingness by Chinese mills to buy their equipment from Japan were additional reasons. Other leading imports were (in order of value, 1936) boilers and boiler-room equipment ($5 million); turbo-generators, sets and parts ($3 million); printing, bookbinding, and paper-making machinery ($2½ million); and electrical motors and parts ($2 million).

Cereals and Flour

In spite of the fact that China is a predominantly agricultural country the import of foodstuffs has in the past presented one of China's greatest problems, both in regard to the food supply of her vast population and the reduction of her adverse balance of trade. During 1935, of the adverse balance of trade, amounting to $343 million, no less than $136 million was attributable to importations under this heading. In 1936, when conditions in China were favourable and bumper crops harvested, only $49 million of the adverse balance of $235 million were accounted for by the import of foodstuffs, principally rice and wheat. In that year rice and paddy imports amounted to 3·1 million quintals (value $267 million), chiefly from French Indo-China, Siam, and Burma, and wheat imports to 1·2 million quintals (value $11·8 million), almost entirely from Australia (see p. 20).

Chemicals and Pharmaceuticals

The value of imported chemicals and pharmaceuticals rose from $37·4 million in 1935 to $51·8 million in 1936. Approximately 50 per cent. were derived from Germany, while smaller amounts came from Great Britain, Japan, the United States, and Belgium. The most important item under this heading was sulphate of ammonia, imports of which were valued at over $14 million in 1936, principally from Germany and the United Kingdom. Sulphate of ammonia is still the only fertilizer extensively used in China, Kwangtung and Fukien being responsible for the largest consumption. Other leading items were bleaching powder, chlorate of potash, soda ash, and caustic soda.

Petroleum Products

Prior to the war China was almost entirely dependent on purchases from abroad for her supplies of kerosine, gasoline, fuel oil and lubricants, which accounted for 9 per cent. in value of the imports. In 1936 kerosine and gasoline imports amounted to 395 million litres and 172 million litres respectively; in both cases the Netherlands East Indies was the principal source of supply, followed by the United States and British Borneo. The demand for these products was increasing as a result of the expanding requirements of government departments and the greater use of motor transport.

Export Trade

Prior to 1931, the bulk of China's exports consisted of agricultural products such as beans, silk, cotton, hides and skins, and vegetable oils. However, from 1932, the export of beans, beancakes, and cereals registered an abrupt decline, and consequently manufactured goods became most important with food, drink, and tobacco receding to third position. Both 1931 and 1932 were abnormal years. In 1931 the world economic depression was reflected in the disastrously low level of foreign trade in China. In 1932 the hostilities in North China and at Shanghai struck at China's most important trade assets. Shanghai, which usually handled about half of the total foreign trade, was isolated for many weeks, while the creation of 'Manchukuo' cost China not only the loss of three of her richest provinces, but also the control of imports and exports through Kwantung Leased Territory. The Manchurian ports and Dairen normally dealt with some 30 per cent. of the total foreign trade, and specialized in the export of beans and bean products. By 1935 conditions had changed and the order was again modified. Raw materials and semi-manufactured goods rose to the first place (41·48 per cent.), manufactured goods came second (32·92 per cent.), while food, drink, and tobacco were third (24·80 per cent.). This indicated that China remained primarily a supplier of raw materials to highly industrialized countries though the products of her secondary industries were exported, particularly to the countries of south-eastern Asia, where large Chinese communities are found (Fig. 35).

The following table gives comparative statistics for the value of the export trade during the three years 1934, 1935, and 1936:

Exports by Commodities, 1934–36 (*dollars*)

	1934	1935	1936
Textile fibres	74,760,986	97,395,860	112,979,740
Animals and animal products (not including hides, leather, skins (furs), fishery and sea products)	77,866,525	80,255,792	103,985,431
Oils, tallow, and wax	31,664,689	57,279,830	91,366,866
Ores, metals, and metallic products	30,737,274	43,574,638	56,742,800
Yarn, thread, plaited and knitted goods ..	54,319,562	42,457,104	47,475,874
Seeds	27,934,725	49,000,512	40,804,825
Hides, leather, and skins (furs)	29,107,646	23,628,606	40,501,923
Tea	36,098,549	26,624,184	30,661,711
Cereals and cereal products	15,722,299	18,920,899	24,792,229
Piece goods	30,763,291	18,838,502	24,148,792
Fuel	8,205,035	8,572,048	13,002,036
Tobacco	9,431,109	9,051,579	10,137,540
Fruits, fresh, dried, and preserved	8,953,514	8,545,621	9,901,696
Medicinal substances and spices (not including chemicals)	10,093,743	9,147,688	9,845,453
Other textile products	9,393,162	7,669,144	9,419,621
Vegetables	9,343,161	8,348,983	9,413,577
Beans and peas	6,953,770	5,255,005	8,277,628
Other vegetable products	6,370,764	6,217,695	7,146,526
Chemicals and chemical products	5,866,089	5,388,451	6,175,529
Paper	5,118,681	4,809,815	5,498,345
Stone, earth, sand, and manufactures thereof (including chinaware and enamelled ware)..	3,160,329	3,330,844	4,074,490
Fishery and sea products	3,074,541	3,098,475	3,179,541
Timber, wood, and manufactures thereof ..	1,692,253	1,917,243	3,006,530
Bamboo	2,639,254	2,543,409	2,934,595
Printed matter	2,496,285	2,209,714	2,389,114
Dyestuffs, vegetable	2,290,499	2,300,171	1,514,701
Spirituous beverages	1,064,981	1,013,096	1,129,152
Glass and glassware	312,739	250,324	372,329
Rattan	116,305	113,507	200,138
Sugar	113,814	2,018	3,995
Sundry list	29,648,705	25,048,303	24,638,676
Total	535,214,279	575,809,060	705,741,403

Source: The Maritime Customs, *The Trade of China*, 1936, p. 73 (Shanghai, 1937).

Raw Cotton and Cotton Yarn

Although the export of raw cotton has declined in recent years, a consequence of the development of China's own industry, there has been a certain amount of trade in short staple cotton (value 1936 $28 million). The largest buyers were the United States and Japan, who used the cotton for mixing with long staple varieties for special purposes, such as making blankets. The export trade in cotton yarn was also declining, the major fall being in exports to British India, which decreased from $8·9 million in 1935 to $5·2 million in 1936.

Silk

Raw silk and silk goods have long played an important part in foreign trade. In 1860 China accounted for about half of the world's export silk, but since then there has been a marked decline (see p. 32) due to Japanese competition and the development of substitute materials. In 1899 raw silk represented 42 per cent. of China's total exports, in 1913 26 per cent., in 1931 13 per cent., and in 1936 only 6 per cent. (Fig. 36). In 1936 about 30,000 quintals of white raw silk valued at $31 million, and nearly 6,000 quintals of

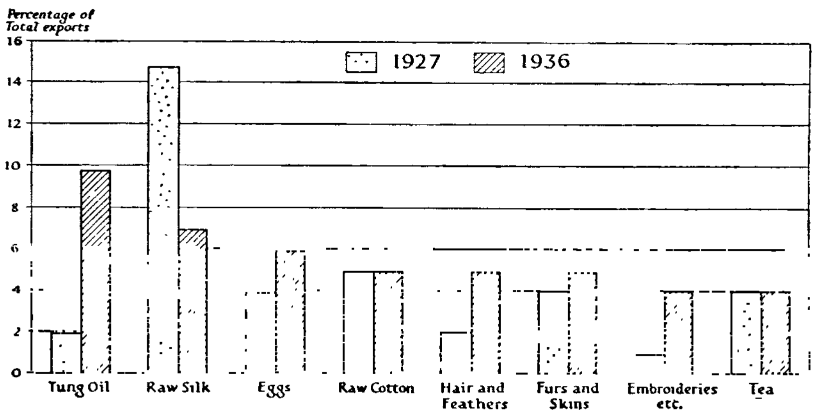

Fig. 36. Major Chinese exports, 1927 and 1936

Based on Deasy, G. F., 'Tung Oil Production and Trade,' *Economic Geography*, vol. xvi, p. 261 (Worcester, Mass., 1940).

The trade of China in the nineteenth century was intimately associated with the export of tea and silk. The decline in the export of tea had already become marked by the end of the first quarter of the twentieth century, and in the following decade silk was ousted from the leading position by tung-oil.

yellow raw silk valued at $4·8 million were exported. The bulk of the white raw silk was taken by the United States, France, and French Indo-China, while over half of the yellow raw silk went to Burma.

Eggs and Egg Products

In the category of animal and animal products, egg products have found a growing place in the world market. Prior to 1937, eggs were exported whole, in the form of frozen mélange, moist, and as dried egg products (albumen and yolks), accounting for nearly 6 per cent. of the total export trade in value. These exports represented between 3 and 4 billion eggs per annum, and the quality was high.

In 1936 the United Kingdom was the largest buyer of frozen, moist whole egg and dried albumen, valued at \$14·1 and \$2·8 million respectively. Dried albumen formed the chief export to Germany and France.

Tea

At one time China enjoyed a monopoly of world tea production (see p. 33), and as far back as 1867 the export of tea to foreign countries amounted to 175,700,000 lb. This rose to 295,000,000 lb. in 1886. Since then, however, the effect of competition from the more efficiently organized industries of India and Ceylon has been felt increasingly, and the total export in 1935 fell to 78,600,000 lb. The trade has so far decreased that it is now only important when there is a crop failure elsewhere. The U.S.S.R. and Morocco were the principal buyers, taking over 80,000 quintals each, followed by the United Kingdom and the United States.

Ores, Metals, and Metallic Products

The total value of the export trade under this heading in 1936 was \$56·7 million, as compared with \$43·6 million during 1935. Chief among the ores was that of iron, which was shipped almost entirely to Japan. Other minerals which have been in demand in the world's markets are antimony, tungsten, and tin, in all of which China is a very substantial producer (Fig. 30). Of all the exports in this group tin ingots and slabs represented the most valuable in 1936, total exports for the year of 112,604 quintals being valued at \$26·8 million, as compared with 91,797 quintals valued at \$20·4 million during 1935. Practically the whole quantity was consigned to Hong Kong with ultimate destination unknown.

Hides and Skins

Hides, skins, and leather occupy a significant place in the export trade, being valued at \$40·5 million for the year 1936. The United States was by far the heaviest buyer, taking about 60 per cent., followed by Japan, 12 per cent., and the United Kingdom, 6 per cent. The hides were derived mainly from the Yangtze valley, and a surplus for export was available only because the Chinese tanning industry was poorly developed. There was a considerable trade in skins, practically the whole of the dog skins, lamb skins, and hare and rabbit skins being shipped to the United States, while the bulk

of the fox skins were shared equally between Great Britain and the United States.

Wood-oil (Tung-oil)

One of the most striking developments in recent years has been the growth of the trade in wood-oil, which in 1936 ranked first among China's exports (Fig. 36). In that year exports reached the record total of 867,000 quintals, valued at $73 million, an increase of 87 per cent., over 1935. Of the total export the United States took approximately 70 per cent., with Hong Kong second, followed by Germany, the United Kingdom, and France.

Bristles

It is estimated that China supplies 75 per cent. of the world's commercial supply of pig bristles in peace-time. As compared with 46,263 quintals valued at $16·2 million during 1935, the export for the year 1936 rose to 52,648 quintals valued at $25·3 million. The United States was the largest consumer, while smaller amounts were sent to the United Kingdom, Germany, Japan, and France.

Piece-goods

An indication of the development of China's secondary industries was the export trade in piece-goods, which was valued at over $24 million in 1936. The most important items were silk piece-goods, silk pongees, and cotton shirtings and sheetings, most of which found markets in British Malaya and the Netherlands East Indies.

Direction of Trade

The most important countries concerned in China's foreign trade have been the United States, Japan, and the United Kingdom, but trade with Germany had, prior to the Sino-Japanese war, made remarkable progress, and during 1936 her position exceeded that of Great Britain (Fig. 37). The aggregate trade handled by these four countries, not including their colonies, represented over 60 per cent. of China's total foreign commerce. In 1936 the United States ranked first with 22·52 per cent., Japan second with 15·99 per cent., the United Kingdom third with 10·62 per cent, and Germany fourth with 11·47 per cent.

The value of the trade with the various countries in 1936 is given in the following table :

Foreign Trade by Countries, 1936

	Exports		Imports		Total	
	Value	%	Value	%	Value	%
	dollars		dollars		dollars	
U.S.A.	186,320,864	26·35	185,511,517	19·64	371,832,383	22·52
Japan	107,212,781	15·17	156,828,106	16·60	264,040,887	15·99
Germany	39,173,952	5·54	150,238,093	15·91	189,412,045	11·47
United Kingdom..	64,883,766	9·18	110,497,460	11·70	175,381,226	10·62
Hong Kong ..	106,546,843	15 08	17,794,509	1 88	124,341,352	7 53
Netherlands India	4,746,317	0·67	74,397,145	7·88	79,143,462	4·79
France	30,388,620	4·30	18,380,536	1·95	48,769,156	2·95
British India and Burma	18,685,589	2·64	24,718,802	2·62	43,404,399	2·63
Belgium	6,321,956	0·89	26,011,111	2·75	32,333,067	1·95
Kwantung Leased Territory ..	18,020,824	2·55	11,397,255	1·21	29,418,079	1·78
French Indo-China	9,893,673	1·40	18,047,674	1·91	27,941,347	1·69
Straits Settlements	15,654,744	2.22	10,837,181	1·15	26,491,925	1·60
Canada	5,270,120	0·75	19,783,898	2·10	25,054,018	1·52
Siam	4,051,226	0·57	18,868,328	2·00	22,919,554	1·39
Australia	6,081,027	0 86	15,989,594	1·69	22,070,621	1·33
Netherlands ..	16,548,028	2·34	4,789,420	0·51	21,337,448	1·29
Italy	3,329,438	0·48	21,225,340	1·29	15,614,778	0·94
Korea	9,762,292	1·38	2,939,569	0·31	12,701,861	0·77
Philippines.. ..	6,103,416	0·86	4,019,120	0·43	10,122,536	0·61
U.S.S.R.	4,209,779	0·60	1,243,785	0·13	5,453,564	0·33
Other countries ..	43,525,660	6·16	60,004,765	6·34	103,530,425	6·30
Total ..	706,790,915	100·00	744,523,218	100·00	1,651,314,133	100·00

Source: *Chinese Economic Journal and Bulletin*, vol. xx, p. 617 (Shanghai, 1937).

Trade with the United States

Since 1932 the United States has occupied a premier position in China's foreign commerce, and in 1936 occupied the first place in both the import and export trade. Imports from the United States represented 19·64 per cent. of China's total import trade by value; and Chinese exports to the United States represented 23·36 per cent. of the total export trade.

In 1936 the principal items imported from the United States consisted of liquid oils and fuels ($30 million), miscellaneous metal manufactures ($17 million), motor vehicles ($11½ million), timber ($10 million), wood pulp, paper, and paper products (9 million), raw cotton ($9 million), tinned plates ($8 million), and machinery and tools ($7 million). Three-quarters of the imports of semi- and fully-manufactured goods consisted of motor vehicles, aircraft (civil and military), radios, refrigeration equipment, and other mass produced goods which are modestly priced necessities in the home market, but are luxuries in most foreign markets.

In regard to the principal exports to the United States wood-oil figured most prominently on the list, amounting to $52 million, while hides, skins, and leather ($24 million) and drawn work, embroideries and laces ($16 million) came next. The export of raw silk and bristles also amounted to a considerable value of over $13 million each. Among less important commodities were ground-nut oil, sesamum seed, and eggs and egg products.

Trade with Japan

In comparison with other foreign countries, Japan's position in the foreign trade of China has advanced with great rapidity during the last forty years, though there was some falling off in the period immediately following the Manchurian crisis. Subsequently there was a recovery and in 1936 Japan ranked second to the United States, accounting for 16·60 per cent. of the imports and 15·17 per cent. of the export trade. This position was due to geographical proximity, a close understanding of the Chinese background and character, and an ability to undersell her competitors.

The principal commodities imported from Japan in 1936 were metals and ores, valued at $21 million, and textile machinery ($12 million). Next in importance were marine products, and chemicals and pharmaceuticals valued at $11 million each, paper and paper products, and wool and woollen manufactures, $9 million each. The import of cotton piece-goods declined from $10 million to $7 million in 1936.

Goods exported to Japan as in previous years were again chiefly composed of raw cotton and cereals, with cotton amounting to $20 million and cereals $18 million. The total of these two items represented more than one-third of the aggregate value of exports to Japan. Other articles like coal, ramie, hides and skins, ores, meat, bristles, and sesamum seed were also exported in considerable quantities.

Trade with the United Kingdom

For many years the United Kingdom was the most important country trading with China, but in recent decades she has had to give way to the United States and Japan, and in the last few years to Germany. During 1936 the British share of China's trade was 11·47 per cent. of the total. In both the import and export trade she occupied the fourth place with 11·7 per cent. and 9·18 per cent. of the respective totals.

Regarding the principal imports from the United Kingdom, metals and ores constituted the largest proportion, valued at $19 million, followed by wool and woollen manufactures ($16 million), vehicles and vessels, and machinery and tools ($11 million each), and flax, ramie, hemp, and jute ($8 million). This trade lies almost exclusively in the semi- or fully-manufactured groups with a steadily increasing emphasis on capital goods, which accounted for 43 per cent. of the total British trade with China in 1936.

Among the chief exports to Great Britain eggs and egg products were the most important, amounting to $22 million in value, representing 36 per cent. of the total exports to that country in 1936. Other articles of importance were bristles ($5 million), wood-oil, tea, and antimony, each valued at $3 million, and hides and skins and raw silk about $2·5 million each. Most of the exports showed an advance as against 1935, the most prominent being egg products, up by $4·3 million, and bristles, wood-oil, and hides and skins each by $1·7 million.

Trade with Germany

After the war of 1914–18 the German share of China's import trade was less than 1 per cent. In 1930 it had recovered to 5·20 per cent., and six years later it was nearly 16 per cent. Her share of the export trade, 5·5 per cent. in 1936, while not so large, placed her fifth on the list of China's customers. Germany held her position by reason of price policy, generous provision of expert technical men on the spot, representatives not only in cities but up-country, and a willingness and ability to grant credit.

Imports from Germany consisted largely of articles for production and construction. Metals and ores (mainly ungalvanized bars, rails, sheets, and plates) constituted the largest proportion, amounting in value to $22 million, followed closely by chemicals and pharmaceuticals ($21 million) and dyes and pigments ($20 million). Imports of machinery and tools were valued at $13 million, and vehicles (locomotives and rolling stock) $7 million. Most of these imports, especially chemicals, paper, metal products, and vehicles, witnessed an advance as compared with previous years.

The largest volume in China's export trade to Germany was represented by eggs and egg products ($6 million), with wool and wood-oil coming second ($4 million each) and casings and ores third ($2 million each). The exports of hides and skins, ground-nuts,

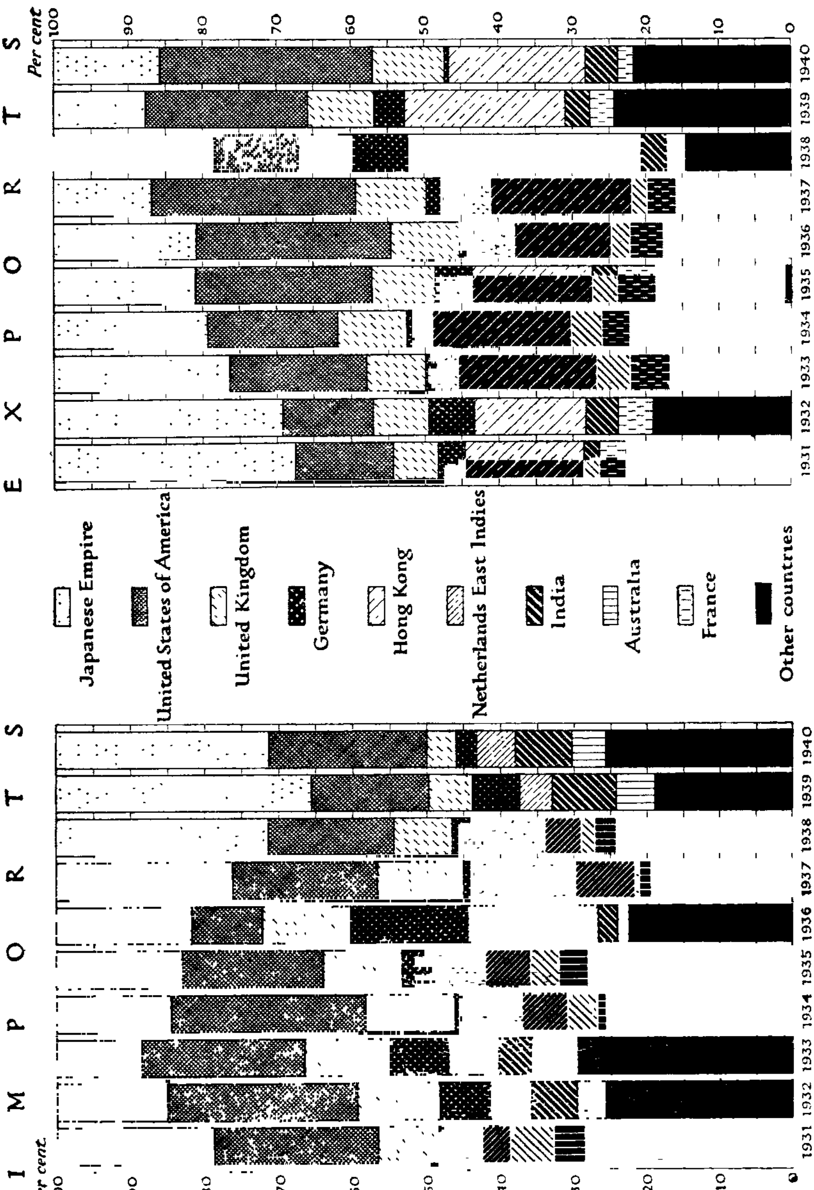

Fig. 37. Direction of trade, 1931–40
Based on statistics in successive annual volumes of Maritime Customs, *The Trade of China* (Shanghai).

bristles, tea, cotton, and antimony were also considerable. With the exception of cotton, all these commodities showed an increase in comparison with 1935, as far as value was concerned.

Trade with Hong Kong

In 1936 Hong Kong ranked fifth in the foreign trade of China, accounting for nearly 2 per cent. of the imports and over 15 per cent. of the exports. While a substantial part of the exports to Hong Kong were destined for re-export to other countries, Hong Kong was a consumer of a great variety of foodstuffs, medicinal substances, fireworks, yarn, etc., from China, and could not be assumed to be solely a trans-shipment depot. For example, the export of animals and animal products from China to Hong Kong was valued at $11 million in 1936, of fruits at $3½ million, of vegetable products at $10 million, and of piece goods at $6 million, the bulk of which were consumed in the colony.

Trade with certain other Countries

Netherlands East Indies. Chinese imports from the Netherlands East Indies in 1936 were valued at $74 million, thus placing the Netherlands East Indies fourth among China's suppliers. The principal items were gasoline, kerosine, and liquid fuel, and sugar. Exports from China amounted to less than $5 million, over half of which was accounted for by cotton yarn.

France. In 1936 France accounted for less than 3 per cent. of the total foreign trade of China. Imports from France consisted mainly of artistic goods such as perfumes and clothing, while silk, tungsten ore and wood-oil were the main items in the export trade.

British India and Burma. The share of China's foreign trade taken by these two countries was valued at only $43 million in 1936. The chief articles imported were raw cotton, rice, grey yarn, and hemp and jute, while the principal lines exported consisted of raw silk pongees, silk piece-goods, and tea.

Belgium. In 1936 Belgium ranked ninth in the foreign trade of China, taking less than 1 per cent. of the exports and supplying under 2 per cent. of the imports. China's purchases consisted mainly of minerals, metals, and machinery, while she was an important importer into Belgium of eggs, buckwheat, and hempseed.

U.S.S.R. Trade relations between China and the Soviet Union have not been very close, and the latter has always ranked low on the list of China's customers. But prior to the present war the Soviet Union did take a high proportion of China's tea sales, and supplied naphtha, fish produce, paraffin wax, starch, newsprint paper, and cotton thread in return.

War-time Developments, 1937–44

Perhaps no other aspect of China's economy has been so hard hit by hostilities as her foreign trade: the general position has deteriorated considerably since the outbreak of the Pacific war in December 1941. In the previous four and a half years trading with the outside world continued despite the blockade of the eastern coast by the Japanese. The extension of military operations, resulting in the loss of Hong Kong and the cutting of the Burma Road in the early months of 1942, deprived China of the last remaining links with Great Britain and the United States. The situation by 1944 was very critical, and China's foreign trade had dwindled to insignificant amounts.

Organization

A study of war-time foreign trade is largely a review of the work of the Foreign Trade Commission which controls the import and export trade. The tasks originally assigned to this organization were to help Chinese exporters to carry on their business, to encourage the production of export commodities and to promote foreign trade. But as the fighting became more widespread, China's need for war and other essential materials and for financial aid from abroad became more urgent. Loans were obtained from the U.S.S.R., the U.S.A., and Great Britain. The Commission was entrusted with the delivery of agricultural products to the creditor nation, and was instructed to conserve foreign exchange and to control or restrict imports as demanded by war-time economy.

The scope of the Commission's functions have been continuously enlarged until it now has exclusive control of the export of such staple products as tea and bristles, and exercises control over foreign exchange proceeds derived from thirteen categories of specified exports. It assumed control over wood-oil in 1939, following the conclusion of the American loan to China, which was to be repaid with the proceeds of wood-oil exported to the United States. In 1940 business operations pertaining to the purchase and marketing of wood oil were transferred to a subsidiary organization of the Foreign Trade Commission, the Foo Shing Trading Corporation, with the American distribution to be handled by the Universal Trading Corporation in New York.

Foreign Trade in War-time

The Chinese Customs reports of the war-time foreign trade of China, issued up to the end of 1941, cover not only ' Free China ' but also the ports of entry under foreign domination. This has caused various unusual phenomena, for example, such things as coal and foodstuffs are both imported and exported. Similarly the depreciation of the Chinese currency has caused values of exported commodities to increase rapidly, whereas the actual quantities exported have sharply declined.

The value of the import and export trade in 1940 and 1941 registered large apparent increases over the first three years of the war, as the following table indicates :

The Balance of Trade, 1937–41

Year	Total Imports	Total Exports	Adverse Balance	Total Imports	Total Exports	Adverse Balance
	millions of dollars			equivalents in millions of sterling		
1937	953	838	115	£56·8	£49·8	£7·0
1938	887	762	125	49·7	31·5	18·2
1939	1,333	1,027	306	80·7	24·4	56·3
1940	2,027	1,970	57	90·9	32·0	58·9
1941 (Jan. to Sept.)	1,886	2,287	(Apparent favourable balance) 401	85·2	30·9	54·3

Note. The conversions into sterling are derived from *Finance and Commerce* (Shanghai), and it is necessary to explain that while imports continued to be expressed in terms of standard dollars, based on the official rate of 1s. 2½d., exports are expressed in dollars based upon actual market rates, notwithstanding the heavy depreciation which occurred from 1938 onwards.

From this it will be seen that in 1940 and 1941 the import trade, amounting to about \$2,000,000,000 annually, had more than doubled in value as compared with the preceding periods. Even more remarkable were the apparent increases in value recorded in the export trade. Between 1937 and 1939 China's sales to foreign countries ranged between \$762,000,000 and \$1,027,000 annually (Fig. 34), but in 1940 exports had jumped at \$1,970,000,000, and for Jan.–Oct. 1942 were estimated to be \$2,577,000,000, 2·8 and 3·8 times respectively the figure for 1936. Since 1940 nearly 90 per

cent. of China's entire foreign trade has been through ports under Japanese control.

Imports

Foodstuffs in the form of rice, wheat, and flour constituted the chief imports of China during the early years of the war. Next in importance came cotton, cotton yarn, and cotton piece-goods, followed by sugar, paper, machinery, vehicles, and gasoline. The large import of foodstuffs was made necessary when the Japanese began to buy all rice stocks in coastal cities like Shanghai, Peiping, and Tientsin for army rations. The position was and still remains extremely difficult in some of the provinces of South China. Parts of the province of Kwangtung produce only 3 to 4 months' rice supply a year and other requirements are covered by purchases from abroad in peace-time. Imports are no longer forthcoming, and severe famines have occurred in many districts.

Exports

The principal exports during war-time have been bristles, wood-oil, silk, and mineral products. At first China's war-time export of wood-oil exceeded the 1936 figure, but after 1938 owing to transport difficulties shipments dwindled. The export of pig bristles was well maintained, and it is estimated that by the end of 1940, over 5,000 quintals were exported through the Foreign Trade Commission in a year. Of this total, most of which came from Szechwan, 3,000 quintals were black bristles and the remainder white.

Because of the urgent demand by the Allies and the domestic need for military use, the Government, in March 1941, nationalized the production and distribution of silk. In spite of transport difficulties silk was exported during the first four and a half years of war. The Burma Road, the China-Soviet Highway, and Hong Kong provided the main export channels; after 1941 traffic along all three was interrupted but silk was still sent by air to India.

Mineral exports have been in the hands of the National Resources Commission. On account of the high cost of production and transport, the Government has often exported such metals as tungsten, mercury, antimony, and tin at a financial loss. Before the outbreak of the Pacific war most of the metals were exported to fulfil barter agreements; since then part of the metal export goes by air to India and part to the U.S.S.R.

Direction of Trade

After the outbreak of war in August 1937 and the subsequent Japanese occupation of the coastal provinces, trade between China and the foreign countries was greatly affected. Japan, by virtue of her military activities, was of course able to derive much benefit from the dislocation of China's trade. The outbreak of war in Europe in September 1939 led to further changes, for European countries as a whole were unable to maintain their foreign trade up to pre-war volume (Fig. 37). The position in 1940 with regard to the leading ten countries was as follows :

Direction of Trade, 1940

Country	Imports		Exports	
	Value (millions of dollars)	Percentage	Value (millions of dollars)	Percentage
United States	435·5	21·30	565·7	28·63
Japan	466·3	22·81	126·4	6·40
Hong Kong	147·0	7·19	367·5	18·60
United Kingdom	81·6	3·99	197·8	9·96
British India	175·3	8·57	89·9	4·55
French Indo-China	138·1	6·76	45·2	2·29
Kwantung Leased Territory	62·3	3·06	105·1	5·32
Netherlands East Indies	107·5	5·26	48·5	2·46
Australia	85·8	4·20	14·7	0·76
Siam	47·9	2·34	43·2	2·18
Others	297·0	14·52	372·1	18·87
Total	2,044·4	100·00	1,976·1	100·00

Source: Chinese Ministry of Information, *China Handbook*, 1937–43, pp. 542–3 (New York, 1943).

From this it will be seen that while Germany, France, and Belgium had dropped out of the picture (see p. 182), and the relative importance of the United Kingdom had shown a marked decline, the countries bordering the Pacific had, as might be expected, almost all made considerable increases. The United States and Japan continued to dominate China's foreign trade, but Hong Kong, which had become one of the chief trade channels, particularly for exports, to and from 'Free China,' ranked a good third. British India, French Indo-China, and Siam also showed a significant improvement. In trade with China as a whole the British Empire led, the United

States was second, and the Japanese Empire was third. The French Empire and the Dutch Empire took fourth and fifth places. These five accounted for between 80 per cent. and 90 per cent. of China's foreign trade. Since the early months of 1942 China's trade with all the foreign countries except Japan has declined, and was practically at a standstill by the end of 1944.

Bibliographical Note

1. The most detailed and authoritative work on the foreign trade of China is *The Trade of China*, published annually by the Maritime Customs at Shanghai in 4 volumes, incorporating detailed statistics and a general report on economic conditions in China. The Maritime Customs also publishes *Shanghai Annual Returns of Foreign Trade, Monthly Returns of the Foreign Trade of China, Shanghai Monthly Returns of Foreign Trade*, and *Decennial Reports* (the fifth and latest issue covering the period 1922–31).

2. Much of the statistical and other material in the above is to be found in a less detailed form in: Woodhead, H. G. W. (editor), *China Year Book* (annually, Shanghai); Chinese Ministry of Information, *China Handbook* 1937–1943 (New York, 1943); *Chinese Year Book* (annually, Shanghai and Chungking)—particularly Chang Chia-chu, 'Foreign Trade,' pp. 846–90 (1936–37); and Tsou, P. W., 'Foreign Trade,' pp. 611–47 (1940–41); and in the issues of *Chinese Economic Journal and Bulletin* (monthly, Shanghai).

3. Other books and articles dealing with economic and trade conditions in China are: Morse, H. B., *The Trade and Administration of the Chinese Empire* (London, 1908); Remer, C. F., *The Foreign Trade of China* (Shanghai, 1926); Lee, E. B. S., *China's Struggle for Tariff Autonomy* (Shanghai, 1929); Ching-chun Wang, 'How China Recovered Tariff Autonomy,' *Annals of the American Academy of Political and Social Science*, vol. clii, pp. 266–77 (Philadelphia, 1930); Clark, Grover, 'China's Economic Emergence,' *Annals of the American Academy of Political and Social Science*, vol. clviii, pp. 84–94 (Philadelphia, 1932); Ho Ping-yin, *The Foreign Trade of China* (Shanghai, 1935); Dietrich, E. B., *The Far Eastern Trade of the United States* (New York, 1942); Greene, K. R. C., and Phillips, J. D., *An Economic Survey of the Pacific Area: Part II, Transportation and Foreign Trade*, pp. 131–4, 154–7 (New York, 1942); Gull, E. M., *British Economic Interests in the Far East* (London, 1943); and the reports on *Economic and Commercial Conditions in China*, issued periodically by the Department of Overseas Trade (the most recent covers the period April 1935–March 1937).

Chapter VI

CURRENCY AND FINANCE

Historical Background: Copper (or Bronze); Silver; Gold; Paper; The Currency Position in 1931.

The New Currency System and Financial Conditions: The Abolition of the Tael; Events leading to the Abandonment of the Silver Standard; China Abandons the Silver Standard; The New Chinese Currency.

Currency and Financial Conditions in War-time, 1937-44: The Effects of the Outbreak of the Sino-Japanese War; Currency Developments in North China; Currency and Financial Conditions in 'Free China'; The Note Issue; Financial Conditions and the Cost of Living; The National Budget; General Conclusions.

Bibliographical Note.

The Chinese currency was modernized in 1935, only two years before the outbreak of the Sino-Japanese conflict, which ceased in 1945. Currency stability, however, has not yet been achieved, and therefore, in order to gain an adequate appreciation of financial conditions in China to-day, it will be necessary, after a brief historical survey, to pass under review in some detail the changes which have taken place during the past ten or fifteen years.

Historical Background

The history of currency in China is full of interest for the student, for to China belongs the distinction of being the first country in the world to create metallic currency, and in the ninth century the first government notes ever issued to take the place of money were placed in circulation by the Emperor Hien-tsung (A.D. 806–821) of the T'ang dynasty. Unfortunately, however, the space at our disposal will not permit of more than an attempt to provide a suitable background for an understanding of the changes introduced within recent years.

Paper, gold, silver, copper (or bronze), and even iron, have all played some part in the history of Chinese currency; but for thousands of years bronze coins formed the base of the currency system, and until about the end of the last century it was only in copper (or bronze) that currency and coinage were synonymous terms in China.

As in most other countries, barter was followed in China in prehistoric times by the use, as currency, of nearly every possible article or material available. Apart from rolls of silk and cowrie shells,

the use of which for payment of taxes persisted into the thirteenth and fourteenth centuries of our era, and many another material or article, axes, spades, knives, bells, armlets, and rings served as currency at one time or another and gradually became transformed for this purpose from real implements and ornaments into smaller inscribed metal reproductions, which served as money. Some writers ascribe the evolution of round money in China to the fact that the handle of the ancient knife money ended in a ring; but it seems more likely that inscribed armlets and rings of bronze, because of their greater convenience in handling, gradually established ascendancy over other forms of money, and that from them was eventually evolved the familiar bronze 'cash,' with the square hole in the centre.

Copper (or Bronze)

This type of coin first made its appearance about 1032 B.C., during the Chou dynasty (1122–256 B.C.) and although weight, size, and inscription underwent innumerable changes throughout the centuries, it retained its main characteristics and its function as a measure of value for the great majority of the Chinese population until early in the present century.

According to Morse,[1] the standard coin introduced by the T'ang dynasty in the reign of Kienfeng (A.D. 666–668) supplied a type which, until the great melting down in the late nineteenth and early twentieth centuries, constituted the standard coinage of the empire. Morse writes:

'The standard introduced by the T'ang dynasty and continuing in theory until to-day was part of a bimetallic system, or even (although gold formed no part of the currency) of a trimetallic system, by which, in weight, 1 gold = 10 silver = 1,000 copper, these being the metallic exchange equivalents in China thirteen centuries ago. The copper coin of this system was made to weigh one-tenth of a tael, making it in value one-thousandth of a tael of silver. This theory has continued to the present time, and was definitely asserted by the inscription, ten centuries later, on the coins of the first Manchu emperor. The copper coinage being a government concern, while silver was left to the tender mercies of the bankers, the fixed exchange equivalence or value of the coins was treated with relative disregard, while the weight was more or less adhered to.'

[1] Morse, H. B., *Trade and Administration of the Chinese Empire*, pp. 122 *et seq.* (London, 1908).

In other words, the copper coinage of this currency system, as of all similar systems before it in China, was the standard of value. In theory, gold and silver should have retained their fixed relationship; but in fact they were left to find their own level. Space does not permit of a full account of the differing value of the copper coins in practically every provincial centre; but the great size of the country and the lack of roads and means of communication permitted local custom to introduce endless variations, which rendered uniformity impossible. For example, in Central China, in one centre or another, strings (*tiao*) of 970 or 980 cash might pass for 1,000, while in North China, where one cash counted as two, the tiao, nominally of 1,000, contained actually 490 coins, being subject to the same ratio of deduction for, say, handling charges, as in Central China. However good the original intentions of the government may have been in regard to the copper coinage, therefore, the provision of a universal standard proved beyond their powers. Moreover, over-issues of the currency were frequent and were encouraged by the surrender by the government of their prerogative of issue from time to time to guilds and commercial bodies. Widespread counterfeiting and adulteration also assisted toward lowering the standard, until, in the end, virtual chaos supervened.

In 1900 the first Chinese modern one cent copper coin was minted at Canton. Issued to represent one-hundredth of a Chinese silver dollar, which by this time commanded a wide circulation, it satisfied a long-felt need, the old bronze cash, as has already been recounted, having outlived its usefulness. For the first few years the demand for the new coin appeared insatiable, and the copper cent commanded a premium; but soon gross over-production throughout the provinces, accompanied by counterfeiting and adulteration, flooded the country with the coin and reduced its value until, in the years just prior to the Japanese onslaught in 1937, the new Chinese national dollar exchanged for 300 or more, to the detriment of the working-class and agricultural communities, whose daily life was based upon the purchasing power of this type of money.

Silver

The history of silver as a medium of payment in China embraces thousands of years; but apart from a few minor exceptions, it was not until A.D. 1889 that silver coins were produced in any quantity under government auspices. Until then, silver, as currency, was not a coin, but a weight, viz. the 'tael.' As every commercial centre

in China had its own particular tael weight and different standards, or even several different standards, existed in each place, while the silver to be weighed might differ as to purity by several degrees, the influence and importance which the banker and money changer enjoyed in China requires no further explanation.

Practically all silver in China was imported from foreign lands, for no payable quantities have ever been mined within the country. Nations which entered into trading relations with the Chinese Empire generally brought silver in payment for goods purchased, and it is recorded how the East India Company paid in Spanish silver dollars for tea and silk, and also how greatly the Chinese resented an outflow of silver in payment for imports of opium.

The Carolus (Spanish) dollar, sometimes called the 'Pillar' dollar because of its design, was the first foreign dollar to be introduced into China, and for many years it was the only foreign coin accepted by the Chinese. The introduction of the Mexican dollar followed about the middle of last century and proved to be a momentous event in the history of Chinese currency, for it became the direct cause of the adoption by the foreign banks in China of the Shanghai tael, as money of account. The Mexican dollar was readily accepted in Canton, where the Carolus dollar was 'demonetized.' Its reception elsewhere in China is described by Morse [1] in the following passage:

'At Shanghai, however, and in the Yangtze basin the Carolus held its own and was the sole currency of the foreign banks and merchants, and for the sale of imports and the purchase of exports and for exchange quotations. The ravages of the Taiping rebellion restricted the consumption of imports, and notwithstanding increased importations of Carolus dollars, collected from all parts of the world, they were soon driven to a premium, which, by 1855, amounted to 25 per cent., and in 1856 to 30 per cent. of their intrinsic value; and the curious spectacle was seen of exchange quoted at Canton at 4s. 6d. per dollar (Mexican of 416 grains) and at Shanghai at 6s. and more per dollar (Carolus of 402½ grains). The situation became intolerable, and on a fixed day merchants' accounts at the banks were transferred, unit for unit, from a currency (the Carolus) containing 362 grains of fine silver, to a currency (the Shanghai tael) containing nominally 525 grains of fine silver per unit.'

[1] Morse, H. B., *The Trade and Administration of the Chinese Empire*, p. 164 (London, 1908.)

In this manner the foreign banks and merchants adopted the Shanghai tael, which continued to be the standard of exchange for all the international trade of China passing through Shanghai from 1856 until the sycee tael was abolished in 1933. The Shanghai tael also served as the standard for the international trade of North China and the Yangtze valley, for all quotations in Tientsin and Hankow taels were merely reconversions from the rate for Shanghai taels.

Other silver dollars, including the Japanese (Yen), United States (Trade), British (Hong Kong), and French (Saigon) followed the Mexican dollar into circulation in China in large numbers, and the Chinese having noted the convenience and serviceability of the silver coins, themselves began, in 1889, to produce silver dollars at the Canton Mint. Other provincial mints followed the example of the Canton Mint, and large quantities of Chinese silver dollars, which, from their design, came to be known as dragon dollars, were soon in circulation; but at first, lacking the prestige of the foreign coins, they were accepted only by weight and not by count. As they offered no seigniorage to the mints, their production gradually fell away, and the mints then turned their attention to the coining of subsidiary coins of a fineness lower than the dollar. First ten and then twenty cent pieces were minted; but, of course, this remained a profitable operation only so long as the coins could be put into circulation at higher than cost price. As always in China, however, adulteration, counterfeiting, and over-issue soon sent the coins to a substantial discount in relation to their face values.

The foreign dollars and the Chinese dragon dollars being of more or less similar weight and fineness, circulated side by side for many years; but shortly after the inauguration of the Chinese Republic a new official silver dollar (viz. the Sun Yat-sen dollar) was minted, of slightly lower weight and fineness, and the operation of Gresham's law, always very much in evidence in China, was hastened so that within a period of years most of the foreign, and even of the Chinese dragon dollars, disappeared from circulation.

Gold

Only very small quantities of gold are produced in China, and the metal has not played a conspicuous part in the history of the currency. Although records exist to show that gold was in use as currency about 1032 B.C., during the Chou dynasty, the unit being a cube of one *tsun* (Chinese inch), weighing one *kin* (one

catty), Morse states [1] that gold seems to have been considered as currency only from the eleventh to the third century B.C. As a commodity in the shape of gold bars, derived mostly from imported stocks, it was extensively used in arbitrage operations, while the Chinese foreign exchanges were on a silver basis. In 1930 import duties into China were made payable in Customs Gold Units, an imaginary unit containing 60·1866 centigrams of fine gold; but since no communication between China and the outside world, except by air, has been possible of recent years, as a result of the Pacific war, this factor has lost much of its significance, at least for the time being.

Paper

Reference has already been made to government notes issued to take the place of money by the Emperor Hien-tsung (A.D.806–821) of the T'ang dynasty (see p. 192). This was the famous *Fei-ch'ien* —' Flying money '—so called because it was issued at offices in the capital representing the various provinces and could be cashed at the respective provincial centres. For this reason it has also been described as the direct ancestor of the bill of exchange. But the first true paper money, as we know it to-day, was issued in Szechwan, where the currency was of iron and doubtless so heavy as to be inconvenient and troublesome. Issued in the first instance by a guild of sixteen of the richest merchant houses, the notes were redeemed each three years over a long period, but eventually the merchants suffered losses and were unable to redeem the notes. The government then took over the right of issue, and it is recorded [2] that in the first year of Tien-sheng (A.D. 1032) outstandings of 1,256,340 *kuan* were secured by a specie reserve amounting to 360,000 *kuan*.

About a century later, when the country was divided between the Southern Sungs and the Kin Tartars, both regimes being at war and requiring money, notes were issued wildly until the country was inundated with paper notes, which became depreciated and were all eventually repudiated by the Mongols, who completed the conquest of China in A.D. 1279. The Mongols (A.D. 1280–1368) continued issuing paper money, the total of which, according to Morse,[3] amounted to some 47,611,276 *ting*, or 2,380,563,800 taels

[1] Morse, H. B., *The Trade and Administration of the Chinese Empire*, p. 119 (London, 1908).

[2] Wagel, S. R., *Chinese Currency and Banking*, p. 66 (Shanghai, 1915).

[3] Morse, H. B., *The Trade and Administration of the Chinese Empire*, p. 137.

nominal face value during sixty-four of the first seventy years of Mongol rule.

Irredeemable notes were also issued by the first of the Ming emperors (1368–1644), but within a short period the finances of the country had improved, so that the government was able to ' resume specie payments.' Thereafter China enjoyed a long period untroubled by the issue of fiduciary notes by any government, for it was not until 1853 that the Ch'ing (Manchu) dynasty recommenced the issue of copper cash and tael notes, nominally redeemable in these currencies ; but which remained unredeemed and eventually became valueless.

From that time onwards the government left note issuing to the private and provincial banks ; but the absence of effective currency regulations was responsible for excessive emissions of notes by all kinds of banks, and even by pawn shops and exchange shops, so that note issues within the country never commanded more than local acceptance. The position eventually became so unsatisfactory that in 1931 legislation was promulgated which required issuing banks to hold specie reserves for at least 60 per cent. of outstanding notes, and a further 40 per cent. in readily marketable securities. Thereafter the larger Chinese banks were enabled to establish their issues, and the use of their bank-notes became more general in the larger centres.

The Currency Position in 1931

Before proceeding to review the reforms and changes introduced by the Chinese government after 1931, it is perhaps worth while to summarize the position of the currency as it existed about that date.

The copper (bronze) coins which had served China as currency for thousands of years had given place to the new minted copper cents ; but these, owing to widespread counterfeiting, adulteration, and over-issue, were circulating at a fluctuating valuation, round about a third of their face value.

The silver ten-and twenty-cent pieces offered a convenient medium of exchange to a large section of the community and commanded a wide circulation ; but these also, and for the same reasons as affected the value of the copper cents, fluctuated in value from day to day in relation to both the silver dollar and the copper cent, although the depreciation generally did not exceed about 20 per cent. to 25 per cent. in relation to the silver dollar.

Silver dollars of various issues, but mainly Sun Yat-sen dollars,

continued to be used in all wholesale transactions, as money of account in the banks, and as security for note issues. Their use as a circulating medium and store of value had spread over the length and breadth of the country, and it has been estimated that not less than about two thousand millions of the coins were in circulation about this time. Due to their comparative convenience and the growing faith in their silver content, they had already all but replaced the cumbersome sycee tael. In Shanghai, Tientsin, and Hankow, however, the foreign banks and merchants still used the sycee tael, both as money of account and for the conduct of foreign exchange transactions, into which gold entered largely as a means of hedging, locally, exchange risks between the Chinese currency, which remained anchored to silver, and external currencies stabilized more or less permanently against gold or gold currencies.

Bank-notes of all the main private and provincial banks in China circulated freely, but on a local basis, banks generally having separate issues for each centre. The notes, in most cases, promised payment in silver dollars and redemption was frequently called for, thereby preventing serious over-issue. The foreign banks also issued notes in terms of both taels and dollars, but the issues of their China branches never, at any time, reached imposing figures. The Hong Kong dollar notes issued by the three British banks in Hong Kong circulated widely in South China, however, and formed a very important feature of the currency in that area.

It will be clear, therefore, that the state of the currency about 1931 offered scope for simplification and co-ordination. The Government, having unified the country and established the new capital firmly at Nanking, were in a position to enforce legislation over the whole country to an extent never before deemed possible, and it is not surprising, therefore, that they decided upon currency reform as a first measure toward improving the economic life of the nation.

The New Currency System and Financial Conditions

The Chinese currency system, which, as we have related, had evolved through the centuries, was completely transformed in 1935 when the Chinese government, having abolished the sycee tael in 1933, abandoned the silver standard and adopted instead a 'Foreign Exchange Standard,' with legal tender bank-notes as the sole circulating medium. The abolition of the sycee tael was the

natural outcome of the widespread use of the Chinese silver dollar, but the abandonment of the silver standard was forced upon the Chinese government, as will be described later, by events quite beyond their control. The adoption of a 'Foreign Exchange Standard' was immediately successful beyond all expectations; but when, less than two years later, Japanese aggression forced China to take up arms in defence of her liberty, it was soon apparent that, if hostilities proved to be of long duration, the stability of the currency would be endangered. China's long fight against the aggressor continues, and, although the currency still functions, its history through the years of struggle has been one of ever-increasing inflation and of almost continuous depreciation. No adequate appreciation of financial conditions prevailing in China to-day is possible, however, without some knowledge of the new currency system, of the causes which led to its adoption, and of the effect upon it of the Sino-Japanese conflict, and as the tale of inflation and depreciation is still unfolding, it will be convenient and, indeed, necessary to deal with all these matters in one connected story.

The Abolition of the Tael

The founding of the Central Bank of China in 1928, following the establishment of the Kuomintang government in Nanking in the same year, marked the commencement of a new era in the Chinese currency and banking systems. Reference has already been made to the legislation promulgated in 1931, which required all Chinese note-issuing banks to maintain adequate reserves of specie and securities (see p. 198). With stability apparently assured, banknotes gained in popular favour, as their portability and convenience offered marked advantages compared with silver dollars, which had already largely displaced the sycee tael in the public esteem. It is hardly surprising, therefore, that the government, as a further step in currency reform, decided to abolish the tael as a monetary unit.

Following the opening of the Shanghai Mint on 1 March 1933 as the sole source of issue of a new standard national silver dollar,[1] the sycee tael was abolished by government decree on 6 April 1933. The change was accomplished smoothly and without disturbing the economic structure of the country on the basis of:

Standard National Silver Dollars 100 = Shanghai Taels 71·50,

[1]

Gross Weight	Fineness	Fine Silver Contents
26·6971 grammes	0·880	23·493448 grammes

and for the first time in history China found herself with a standard silver coin as the recognized national currency unit.

The substitution of the new standard national silver dollar for the sycee tael did not, of course, alter in any way the status of the Chinese currency, which remained, as before, on the silver standard.

Fig. 38. Price of bar-silver in London, 1910–39

Based on *A Table showing the Monthly Fluctuations, in London, of the Price of Bar Silver per Oz. Std.* (Pixley and Abell, London, 1940).

Moreover, it is safe to say that no thought of departure from the silver standard had yet been entertained by the Chinese government, for, China being almost entirely agricultural, the retention of the silver standard was considered a vital necessity as a protection against violent internal price fluctuations, on the theory that, if permitted free movement, the prices of silver and commodities over a period generally moved in sympathy.

Events Leading to the Abandonment of the Silver Standard

This theory, however, was upset by the steep rise which occurred in 1931 in the price of silver expressed in terms of the currencies of the nations which abandoned the gold standard in that year (Fig. 38). These included Great Britain, the British Colonies, and Japan, the last mentioned being of special importance as a strong competitor in the Far Eastern export market. The effect upon China was severely deflationary, prices commenced to fall, exports declined, and these movements continuing, the country had become,

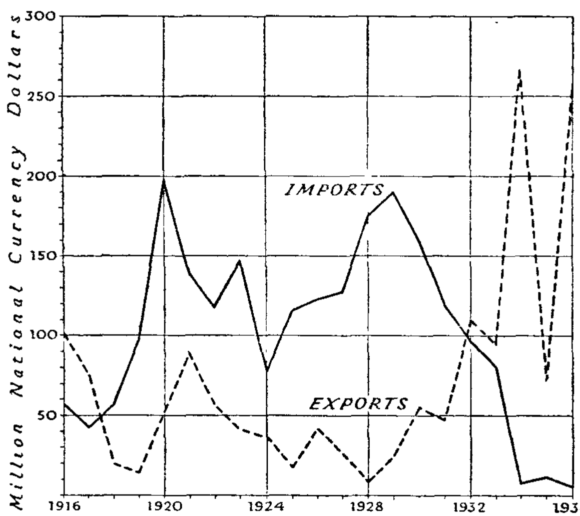

Fig. 39. Movements of silver, 1916–36

Based on statistics in successive annual volumes of Maritime Customs, *The Trade of China* (Shanghai).

by the end of 1932, a nett exporter of silver for the first time since 1917 (Fig. 39). The United States abandoned the gold standard on 18 April 1933, and further deflation occurred in China, although it was mitigated slightly by the recovery in world prices; but China contrived to carry on, and it was not until the passage of the United States Silver Purchase Act in June 1934, which was followed by considerable rises in the price of the metal, that the strain upon China's financial structure became intolerable. From July to October 1934 the nett exports of silver exceeded \$200,000,000, the movement ever gaining momentum, and the National Government, in an effort to stem the flow and avert a crisis, imposed a 10 per

cent. tax and a variable equalization charge on exports of the metal as from 15 October 1934.

This measure permitted the retention of the silver standard internally, but broke the traditional link between the external value of the currency and the world price of silver. The measure failed, however, for although the visible outflow of silver ceased, smuggling was encouraged and soon assumed alarming proportions. An extensive and long-continued flight from the dollar induced speculation and panic, which undermined the whole financial structure and the government was forced to introduce a new monetary system.

China Abandons the Silver Standard

The new monetary system was announced to the public in a decree dated 3 November 1935, which established the notes of the Central Bank of China, the Bank of China, and the Bank of Communications (the notes of the Farmers' Bank of China were included later), as the sole legal tender within the country, and provided that all silver in the hands of the banks and general public should be exchanged for such notes within a period of three, later extended to six, months. All obligations, including taxes and debts contracted prior to the issue of the decree, were to be discharged in the new currency. The centralization and control of the note issues and reserves were placed in the hands of a Currency Reserve Board, and it was also announced that the Central Bank of China would be organized to function as an independent Central Reserve Bank, and that plans for financial adjustment had been made whereby the national budget would be balanced in eighteen months. The foreign exchange value of the dollar was fixed on the basis of 1s. 2½d. (the average rate for the previous five years), and so that stability would be assured, the three government banks were ordered to sell and buy unlimited amounts of foreign currencies at rates ⅛d. below and ⅛d. above the basic rate, later increased to ¼d. below and ¼d. above the basic rate (Fig. 40).

The decision to stabilize the currency on the basis of 1s. 2½d. was a bold step in the absence of any promise of assistance from foreign powers interested in China's welfare, but the gravity of the crisis permitted of no other remedy. The adoption of a 'Foreign Exchange Standard,' of course, relieved the government of the necessity of retaining within the country any large stocks of silver, while the nationalization of the metal enabled them to requisition, in exchange for legal tender bank-notes, the silver held by the government banks,

the foreign banks [1] (who, although still enjoying extraterritoriality, had nevertheless pledged their assistance), the Chinese commercial banks and the general public, and thus provide the foreign exchange reserves required to maintain the stability of the currency. The difficulties which, in the ordinary course, must have attended the sale of such very substantial amounts of silver in world markets were smoothed out by an arrangement whereby the United States government, in pursuance of their silver purchasing policy, agreed to take over large quantities at a favourable fixed price.

From its inception the new currency system proved a phenomenal success. Exchange stability, hitherto practically unknown in China, was maintained with beneficial results. World prices continued to recover and the improvement was faithfully reflected in China's price index, which, as the exchange value of the dollar had been fixed at a rate considerably lower than had been ruling immediately prior to the change, instantly responded. For the same reason the silver sold to the United States and in world markets resulted in the accumulation of very adequate reserves of foreign exchange. The circulation of legal tender bank-notes rapidly increased against the surrender of large amounts of nationalized silver dollars and in exchange for notes of other banks withdrawn from circulation. The popularity of the new legal tender notes grew apace and they penetrated into far outlying districts formerly served almost exclusively by provincial note issues, which they gradually displaced. A further step toward unification of the currency was a new centralized issue of subsidiary coins in decimals of the standard dollar, designed to supersede the heterogeneous collection of depreciated coins which hitherto had hindered, rather than aided, the free exchange of goods throughout China.

The New Chinese Currency

Thus since the passing of the Currency Law of 3 November 1935, which abandoned the silver standard and set up the Chinese national currency dollar, or *Yuan*, as the monetary unit, the legal tender

[1] Twenty foreign banks were established in China. Of these four were British, viz. The Chartered Bank of India, Australia, and China, The Hong Kong and Shanghai Banking Corporation, The Mercantile Bank of India Ltd., and the P. & O. Banking Corporation Ltd.; three were American, viz. the Chase Bank, the National City Bank of New York, and the American Express Co. Inc.; two were French, two Dutch, one German, one Italian, one Belgian, one Russian, and five Japanese.

has consisted of inconvertible bank-notes issued by the four government banking institutions, viz :

The Central Bank of China
The Bank of China
The Bank of Communications
The Farmers' Bank of China

in denominations of one, five, ten, twenty, fifty and one hundred dollars Chinese national currency. The same law abolished the privilege of issuing notes hitherto enjoyed by a number of private banks, the liability for such notes as remained in circulation being taken over by the Central Bank of China.

The notes forming the legal tender currency being inconvertible, the government banks, in order to maintain stability, were authorized to buy and sell foreign exchange to an unlimited extent.

Subsidiary notes of denominations of twenty and ten cents Chinese national currency were issued by the government banks, and the following subsidiary coins were minted under the auspices of the Chinese National Government : [1]

Nickel Coins

20 cents weighing 6 grammes gross
10 ,, ,, 4·5 ,, ,,
5 ,, ,, 3 ,, ,,
Composed of 100 per cent. pure nickel

Copper Coins

1 cent weighing 6·5 grammes gross
½ ,, ,, 3·5 ,, ,,
Composed of 95 per cent. copper and 5 per cent. tin-zinc alloy.

Currency and Financial Conditions in War-time, 1937–44

Thus in 1935 at long last China appeared to be on the high road toward achievement of a unified currency, which would be known and accepted at its face value and without question from end to end of that vast country. A good harvest in 1936 seemed to set

[1] Owing to the Sino-Japanese hostilities, minting operations were discontinued at the central Shanghai Mint in August 1937, later to be resumed at Wuchang, Chêngtu, and Kweilin.

the seal upon China's prospects, foreign trade improved, and by the summer of 1937 it appeared that an era of unprecedented prosperity was about to dawn.

The Effects of the Outbreak of the Sino-Japanese War

It was, therefore, upon a nation striving after unity and bent upon reconstruction and reform in financial matters that the thunder clouds of war settled early in July of the same year. At first, as they were fully engaged with the military aspects of the struggle, interference by the Japanese with currency and commerce was mainly incidental, and after the initial shock the Chinese, with characteristic resourcefulness, found means to continue the exchange of commodities, both between the occupied and unoccupied zones and with the outside world, on a considerable scale. Later on, however, when the various occupied areas were brought more firmly under Japanese domination, trade and commerce and the currency were subjected to deliberate and ever-increasing interference and restriction. Grave economic consequences followed the Lukouchiao 'incident,' when, on 13 August, hostilities were extended to Shanghai. All the Chinese banks in Shanghai immediately closed, to re-open four days later protected by a moratorium order, which provided, *inter alia*, that deposits could no longer be withdrawn in legal tender bank-notes, but only by cheque, good for inter-bank settlement within the clearing area. This timely action effectively prevented any wholesale flight from the currency and enabled the Chinese government to maintain the official exchange rate.

The cost of prosecuting the war and the Japanese occupation of ever-growing areas of the country gradually weakened China's financial position; but it was not until 14 March 1938 that any restrictions were imposed by the Chinese government upon the sale of foreign exchange by the government banks. The restrictions then imposed were designed to protect the foreign currency reserves of the government from the threat inherent in the establishment in Peiping and Tientsin on 10 March of a new bank of issue under Japanese auspices, called the Federal Reserve Bank of China. The Northern Provincial government had announced that the note issue of the new bank would be the only legal tender in North China, and that it would retire the old bank-notes in circulation there within specified periods, all such notes to have the same parity for the time being as the new legal tender. The Japanese being by this time in control of the greater part of North China, the new

bank soon acquired large supplies of Chinese national currency dollars, which, but for the restrictions upon the sale of foreign exchange introduced by the Central government, would undoubtedly have been utilized to raid the reserves of the Chinese currency.

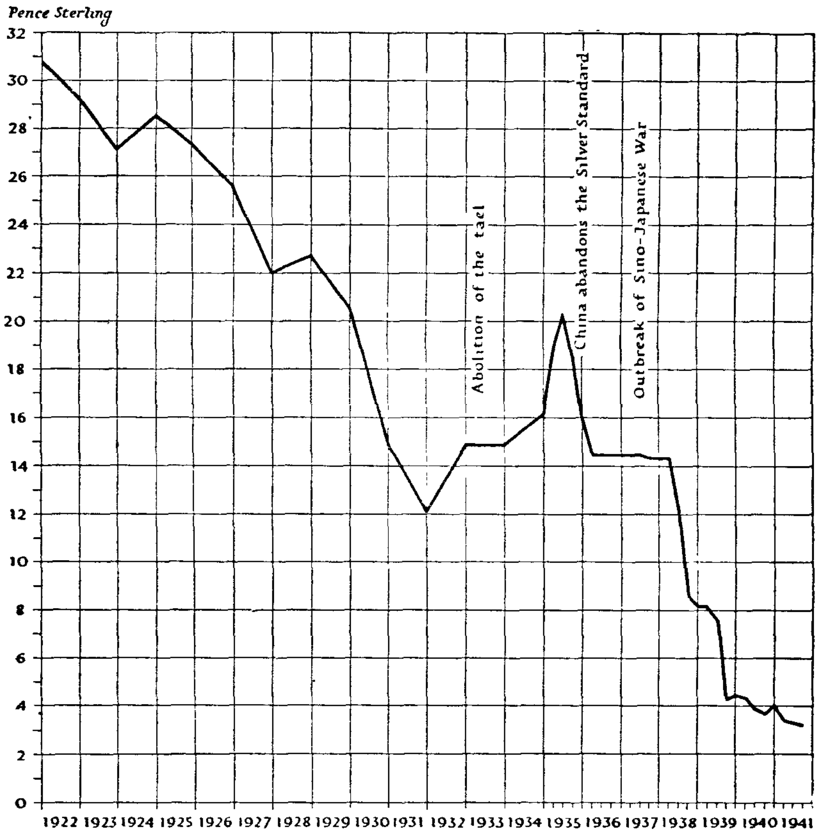

Fig. 40. The value of the tael-dollar, 1922–41

The value of the dollar has been used throughout for the sake of comparison. Prior to 1933 the original quotations were in taels but have been converted into dollars.

Sales of foreign exchange at the official rates were restricted to supplying cover for essential imports ; but the demand, even for legitimate business, was too great and an open market developed, in which, by November, the value of the Chinese national currency dollar had declined to 8d. It was held at this level by means of operations carried out on behalf of the Chinese government by a

leading foreign bank until early April 1939, when the committee of the newly formed Chinese Currency Stabilization Fund commenced to operate. The fund amounted to £10,000,000, subscribed as to half by the Hong Kong and Shanghai Banking Corporation and the Chartered Bank of India, Australia, and China, in the proportions of £3 and £2 millions respectively, under the guarantee of the British government, and half by the Bank of China and the Bank of Communications.

In relation to the task undertaken, the amount of the fund was small, but the committee's operations were attended by a creditable measure of success. Violent fluctuations were ironed out, some confidence in the currency returned, and trade was facilitated. Due to the necessity to finance the war effort, however, China had already started upon the path of currency inflation and legal tender notes poured into Shanghai from the unoccupied zones, via Hong Kong and Canton, for conversion into foreign currencies. The fund eventually withdrew its support from the market on 7 June, to allow the dollar to seek its own level. On 29 June the central government, in an endeavour to stabilize the position, again imposed a moratorium similar to that decreed about two years previously. Conditions on this occasion were unfavourable, however, and the effect was limited and temporary, so that, in spite of intermittent support from the Stabilization Fund, the exchange value of the Chinese dollar, although kept within control, continued to fall, until in December 1940 it averaged only slightly over 3½d. (Fig. 40).

It is inevitable, of course, that support of the external value of a currency should provide the seeds of its own defeat. Exports are discouraged and imports encouraged, and to such an extent was this the position in China that the visible import surplus in 1939 rose to the hitherto unprecedented figure of £56½ millions, only to be exceeded at £58½ millions in 1940. The paucity of exports was accentuated by the Central government reserving some of the main commodities, notably tea and tung oil, and various metals including tin, tungsten, and manganese ore, which they doubtless utilized to satisfy the terms of the 'barter loans' entered into mainly with the U.S.S.R. and the United States of America.

During the first half of 1941 the Chinese national dollar showed greater resistance to depreciation at the lower levels prevailing. Contributing factors to this normally desirable feature were increased remittances from Chinese abroad, due to the low value of the dollar

and the expanding prosperity enjoyed by the Chinese in Malaya, the Netherlands East Indies, and elsewhere, until the outbreak of the Pacific war, and to heavy reconversions of foreign currencies belonging to speculators and others, who feared that their balances abroad might become immobilized. In July the United States and Great Britain, at the instance of the Chinese National Government, applied freezing orders to Chinese assets in these countries, and for a time China's trade with the outside world, except Japan and 'Manchukuo,' was brought almost to a standstill. The newly formed Chinese Currency Stabilization Board (established on an international basis by the Chinese, British, and United States governments to take over the balance of the existing Stabilization Fund and operate a much larger fund) exercised jurisdiction over all trade with the British Empire and the United States, and allotted exchange for approved imports through authorized banks in Shanghai at $3\frac{3}{16}$d. Only trade which would assist the Chinese war effort was financed, and the wheels of commerce had again started to revolve, when the outbreak of the Pacific war on 7 December 1941 put an end to all intercourse with the occupied zones, including, of course, the Shanghai International Settlement, and rendered further operations impracticable.

No survey of the currency position in China would be complete without recording the introduction by the Japanese of large quantities of yen currency notes into the country and the issue by the army of occupation of military yen notes in Central China, these currencies having no other backing than their acceptability in areas under Japanese control. The Japanese also sponsored the opening of two note-issuing banks in Central China—the Hua Hsing Commercial Bank in Shanghai and the Central Reserve Bank (Nanking) in Nanking. The firstnamed was inaugurated on 1 May 1939, and immediately issued notes 'which would be freely convertible into foreign exchange,' but the necessity for retaining adequate reserves precluded uncovered issues of notes and operations remained of small dimensions.

The Central Reserve Bank (Nanking) was opened on 6 January 1941 with the ostensible object of 'unifying the currency systems with a view to stabilizing finance in China.' The notes issued, which at the time of writing have reached unknown, but undoubtedly very large figures, were originally interchangeable at par with Chinese national currency dollars, but later on attempts were made to double their value in relation to the latter.

Currency Developments in North China

Prior to the establishment of the Federal Reserve Bank of China in Peiping and Tientsin on 10 March 1938, the currency in North China, as in all other parts of China, was the Chinese national currency dollar. The notes issued by Federal Reserve Bank were designed to become the only legal tender in North China, and all the old notes in circulation were to be retired within specified periods. Under these circumstances the central government withdrew its support from the national currency dollar in North China (the notes were marked, except those issued by the Central Bank of China, with the name of the city of issue), which, of necessity, thereafter functioned independently. Nevertheless, the national currency dollar remained convertible into foreign currencies at rates more or less in line with those prevailing in Shanghai, as a result of careful arbitration by the foreign banks in Tienstin, based on the values of import and export exchange settled through their medium.

The exchange rate for the new legal tender was to be on a par with the yen at 1s. 2d., and it will be apparent that the founding of the new bank represented an important step toward the realization of Japan's much bruited policy of bringing China, like 'Manchukuo,' within the yen bloc. The new bank-notes had no foreign currency reserves other than credits of some yen 100 millions extended by the Bank of Japan, the yen itself being a controlled currency, and therefore there was no means of establishing the value of the currency outside the yen bloc. The promoters, however, expressed the intention of taking over the silver reserves, estimated at about silver $56 millions, held in Tientsin and Peiping as part cover for the note issues of the Chinese government banks in North China; but as the silver was stored partly in the British and French concessions in Tientsin and partly in the Legation quarter in Peiping, it is improbable that this intention was realized until the outbreak of the Pacific war, and although valuable, the possession of the silver was difficult to turn to advantage.

The new legal tender (commonly referred to as 'F.R.B.' currency), far from circulating at par with the yen, circulated from its inception at a varying discount, side by side with the national currency dollar. The Japanese had no intention of allowing this state of affairs to continue, however, and after the lapse of about a year, during which the 'F.R.B.' note issue assumed large proportions, various decrees were issued by the Northern Provincial Government

in February and March 1939, which provided for the handing over of all foreign exchange resulting from exports, on the basis of 1s. 2d. per ' F.R.B.' dollar, to the new bank, and rendered any person within the Japanese occupied area found in possession of national currency dollars liable to a fine and confiscation of property. The rigid enforcement of these regulations soon brought all trade in North China to a complete standstill, for, in spite of the use of the ' link ' system, whereby importers compensated exporters on a basis of barter, trade in North China was disrupted, resulting in the spread of misery and want throughout the northern ports whose prosperity depended upon the continuation of trade with the hinterland. In June 1940 further regulations were issued which required permits to be obtained for imports of goods (with a few exceptions) from countries other than Japan and ' Manchukuo,' and ruled that foreign exchange could only be obtained with the permission of the Federal Reserve Bank. The Japanese thus obtained a complete stranglehold upon all the trade of North China. That they ruined it in the process did not disturb them unduly, for they undoubtedly considered that they could revive it on lines more suited to their own economy.

By the means already described and by other discriminatory regulations, the enforcement of which was assured by control of the customs, the value of the ' F.R.B.' currency was forced up in relation to the national currency dollar, the demand for which declined, until, during 1941, between 40 and 50 of the former exchanged for 100 of the latter. This development caused much distress in North China, for, owing to scarcity, shopkeepers and holders of goods were in a position to demand and receive payment in ' F.R.B.' currency for goods priced on the basis of the national currency dollar.

The note circulation of the Federal Reserve Bank was estimated at some ' F.R.B.' $750,000,000 at the end of 1940—the latest figures available—which indicated a considerable degree of inflation; but with complete control of imports and exports between North China and Japan, some sort of parity with the yen—itself doubtless ere now a heavily depreciated currency—may have been established.

Currency and Financial Conditions in ' Free China '

The Chinese national currency dollar in ' Free China ' during the period between the outbreak of Sino-Japanese hostilities and the investment of the International Settlement at Shanghai after the

attack on Pearl harbour on 7 December 1941, circulated at a considerable discount, expressed in terms of the same currency at Shanghai. This was a natural consequence of restrictions upon the free movement of goods and services between the occupied and unoccupied zones and of the support extended to the currency in Shanghai. In Chungking, the seat of the National Government, the official rate of the national currency dollar was successively lowered from 1s. $2\frac{1}{2}$d. to 7d., $4\frac{1}{2}$d. and finally in October 1941 to $3\frac{3}{16}$d., in conformity with rates ruling in Shanghai, the main market then in touch with the outside world (Fig. 40).

On the occupation of the International Settlement at Shanghai by the Japanese, after Pearl harbour, the Chinese Currency Stabilization Board transferred the seat of its operations to Chungking. But international trade in the normal sense of the term was practically non-existent, and their functions were confined to allotting foreign exchange to cover approved remittances to foreign countries, or to the accepting of foreign exchange, against the disbursement of local currency, representing remittances to China to cover the working expenses of foreign embassies, firms and residents, family remittances from Chinese abroad and remittances to missionaries, and for charitable purposes. In the absence of normal imports, or the necessity for making substantial remittances abroad, China's foreign exchange reserves should have been considerably augmented, especially as until recently the official rate remained at 3d., although, on a purchasing power parity, the equivalent of the national currency dollar was but a fraction of that amount. Various concessions were eventually made to remitters to China in the shape of exchange subsidies of 50 per cent., and later 100 per cent., which were extended to remittances in favour of famine and relief funds, diplomatic and consular officials, missionary, medical, cultural, and philanthropic enterprises, including Chinese family remittances and later to firms and companies in cover of expenses. The national dollar, however, still remained greatly overvalued at the official rates, even allowing for the subsidy, for U.S. dollar notes, of which large quantities are to be found within the country, were being exchanged in November 1944 at about N.C.$300 to U.S.$1, with a tendency toward much higher quotations.

The trade of 'Free China' with the outside world in the period 1937–41 was largely confined to an exchange of goods with Great Britain, the British Empire, and the United States of America, some considerable proportion of the exports being directed toward the

fulfilment of the terms of the sterling and U.S. dollar credits extended to the Chinese National Government by Great Britain and the United States. The commodities appropriated by China to this purpose consisted mainly of tung oil and various metals, principally tin, tungsten, and manganese, which, together with all other exports, found their way by devious routes, including the Burma Road, to ports where they could be shipped. The outbreak of the Pacific war, resulting in the capture of Hong Kong and the cutting of the Burma Road by the Japanese, closed, at least for a time, the last remaining trade routes for 'Free China's' exports and imports to and from the outside world, except the Chinese-Soviet Highway and by air. It might well be imagined that, under such conditions, trade with the outside world would have ceased; but the exchange of goods with the United States of America, Great Britain, and India continued, and imports into China showed a steadily rising tendency, while exports were well maintained when all the difficulties are taken into consideration.

Trade between 'Free China' and the occupied portions of the country, even to-day, is considerable. Apart from the necessity to import foodstuffs in years of poor harvests, China in the past was normally a self-supporting country; but this, of course, presumes the free interchange of commodities throughout the length and breadth of the country. In the period between the commencement of Sino-Japanese hostilities and the outbreak of the Pacific war, exports from the occupied areas into the free zones were encouraged, for by these means the Japanese acquired national currency dollars, with which to purchase foreign exchange in the Shanghai market. This policy was reversed as soon as the Shanghai exchange market lost its contact with the outside world, and a currency battle between the occupied and unoccupied zones developed, each area attempting to purchase as much as possible from the other in exchange for notes no longer convertible. According to such reports as are available from Shanghai, the Nanking puppet government, in an endeavour to eliminate the national dollar from circulation within the territories under their nominal authority, abandoned their policy of free interchange between Central Reserve Bank (Nanking) ('C.R.B.') notes and Chinese national currency notes at par, and embarked upon a policy designed to discredit and depreciate the latter. After declaring that from 31 May 1942 the national currency dollar would cease to be legal tender, and prohibiting its use, either as a medium of exchange or as a money of account, exchange into 'C.R.B.'

dollars, at the rate of one 'C.R.B.' dollar to two national dollars, was permitted during the period between 8 and 18 June, large amounts of national currency dollars being paid for by means of bonds of the Nanking puppet government. Currency chaos developed and the main result was a flight from currency notes into commodities, the prices of which soared almost at once to unprecedented heights, whether quoted in terms of national currency dollars, 'C.R.B.' dollars, or military yen. Widespread distress and suffering resulted, as wages had not increased proportionately. Doubtless considerable quantities of national currency dollars were exchanged into 'C.R.B.' dollars, but many holders elected, in anticipation of an Allied victory, to retain their national currency dollars, and it is significant that the exchange rate between the two currencies, both greatly depreciated, has moved recently in favour of the national currency dollar. According to news emanating from Foochow, the exchange rate between that city and Shanghai in October 1944 was around N.C.\$600 = 'C.R.B.'\$1,000, while in Shanghai itself, it is said that as many as 'C.R.B.'\$800 are exchanged for one United States dollar note.

The Note Issue

The following table gives details of the outstanding features of the note issue position since 1935:

Note Issue, 1935–42
(*Figures in Millions of National Currency Dollars*)

Name of Issuing Banks	End of 1935	End of July 1937	End of 1939	End of June 1940	End of 1942
Central Bank of China	176·1	382·8	1,347·0	1,623·4	Not available
Bank of China	286·2	517·7	772·0	1,100·2	2,739·2
Bank of Communications	176·2	336·0	597·4	727·6	1,681·4
Farmers' Bank of China	29·9	208·4	365·4	510·9	Not available
	668·4	1,444·9	3,081·8	3,962·1	
Seven commercial banks (estimated)	200·0	80·0	80·0	80·0	Not available
Total ..	868·4	1,524·9	3,161·8	4,042·1	

These figures, with the exception of those of the seven commercial banks, are derived from official sources. Since June 1940, information regarding the Central Bank issues has not been made available ; but since that date Central Bank notes have continued to represent a steadily increasing proportion of all national currency notes in circulation, and since 1 July 1942 the whole note circulation has been concentrated in the hands of the Central Bank. According to *Finance and Commerce*, Shanghai, of 15 January 1941, the Shanghai market estimated the total of notes in circulation issued under the authority of the Chinese National Government at the end of 1940 at no less than N.C.$8,000 million, not including provincial issues amounting to about $950 million. The yen bloc currencies circulating in the occupied zones were similarly estimated at some $1,925,000 on the basis of rates of exchange then ruling, so that at the end of 1940 there was estimated to be a grand total of about $10,875 million in inconvertible paper circulating within the country. A telegram from Chungking, dated 24 March 1942, purporting to come from official sources, placed the Chinese government note issue at N.C.$16,000 million. This figure compares with $8,000 million at the end of 1940, and it is safe to say that the total of notes in circulation in China—all issues—must have considerably exceeded $20,000 million at the end of 1941.

In the absence of information, it is useless to speculate upon the extent of the issues during the last three years ; but if the budget estimates which have appeared from time to time afford any indication of the inflation of the note circulation, the figure of $20,000 million, or rather $16,000 million—for the budget only covers estimates of expenditure within ‘ Free China ’—must have been multiplied quite a few times since 1941. The issues of notes by the Japanese—yen and military yen—and by the Central Banks of the puppet governments at Nanking and Peiping must also run into very large figures.

Financial Conditions and the Cost of Living

The sets of figures in the table on p. 217 have been placed side by side, as their relationship should prove of interest ; but in view of the rapidity with which conditions in China have changed during the past decade, the vastness of the country and the inadequacy of means of transport and communication, no figures applicable to any one place can convey a true picture of current living conditions throughout the sub-continent. This is well illustrated in the

following table, which reveals the relationship of the cost of living indices in different centres in November 1944 :

Place	Index (Chungking = 100)
Tatsienlu (Sikang)	161·98
Chêngtu (Szechwan)	118·20
Neikiang (Szechwan)	112·77
Sichang (Sikang)	99·66
Sian (Shensi)	92·66
Yuanling (Hunan)	84·33
Changteh (Hunan)	74·72
Lichwan (Hupeh)	69·06
Shiuchow (Kwangtung)	66·85
Nancheng (Shensi)	66·25
Lanchow (Kansu)	58·49
Kanhsien (Kiangsi)	52·30

In general it may be said that since currency depreciation supervened, property owners have benefited, as rents have risen ; that producers and holders of consumption goods in Shanghai and elsewhere have made, and probably continue to make, large profits expressed in terms of local currency, and that farmers everywhere are reaping the benefit of rising prices. It is perhaps unnecessary to state that benefits accruing as a direct result of inflation are likely to prove ephemeral, but at least property owners and farmers have been able to reduce, or liquidate, long outstanding debts. On the other hand, the usual time lag in the alinement of wages and salaries to the rising cost of living has caused, and continues to cause, hardship and distress among the wage-earning and salaried classes, and various schemes have been introduced to alleviate conditions for these classes by control of prices or by grants of rice and cloth, house allowances, etc. The following paragraph, which appeared in the *Annual Report of the China Association* for 1941–42, with acknowledgments to the *China Air Mail* and the *Far Eastern Survey*, sheds considerable illumination upon the position existing in China at the time of the outbreak of the Pacific war :

'Largely as a result of the war (the Sino-Japanese war), there has been since 1937 a very steep rise in prices. The most important commodity price, that of rice, had by last November (1941), in the case of "government rice," risen to $6 for one ton of 16 lb., or about 8 times its pre-war figure ; in the case of rice only semi-controlled it had risen some 26 times, while uncontrolled free-market rice had risen much more, and stood in some places at

External Value of the Chinese Dollar related to Events

External Value of the Chinese National Dollar according to Exchange rates quoted in Shanghai 1931–41					Index No. of Wholesale Prices in China 1936 = 100	Index of Workers' Cost of Living in Shanghai 1936 = 100	Related events or facts
Period	Sterling		U.S. Dollars		General Index	General Index	
	Highest	Lowest	Highest	Lowest			
	s. d.	s. d.	cents	cents			
1931	1 5·2	0 10·0	26·3	19·9	116·8	108·36	Gold standard abandoned by Great Britain and Japan.
1932	1 4·6	1 1·6	24·0	18·9	103·6	102·87	
1933	1 3·7	1 1·6	34·0	19·4	95·7	92·51	Gold standard abandoned by United States.
1934	1 6·2	1 2·5	37·5	30·9	89·5	92·68	U.S. Silver Purchase Act passed.
1935	1 8·4	1 2·4	41·5	29·4	88·6	93·99	China abandoned silver standard.
1936	1 2·5	1 2·2	30·0	29·4	100·0	100·0	
1937	1 2·4	1 2·2	29·4	29·2	118·9	118·15	Outbreak of Sino-Japanese conflict. Government Note Issue $1,525 millions.
1938	1 2·2	0 7·9	29·2	15·4	140·7	152·90	
1939	0 8·0	0 3·2	15·6	5·5	226·4	205·85	
1940	0 4·5	0 3·0	7·4	4·3	475·9	438·38	Government Note Issue end June $4,042 millions. Estimated end year, $8,000 millions.
1941							
Jan.	0 3·4	0 3·3	5·4	5·1	600·2	597·19	
Feb.	0 3·4	0 3·3	5·5	5·2	630·1	602·29	
Mar.	0 3·4	0 3·1	5·5	5·1	697·5	679·99	
Apr.	0 3·2	0 3·1	5·2	5·1		732·79	
May	0 3·2	0 3·1	5·2	5·1		801·81	
June	0 3·2	0 3·2	5·4	5·2		757·96	
July	0 3·2	0 3·1	5·4	5·1		800·32	
Aug.	0 3·1	0 2·8	5·3	4·7		885·55	
Sept.–Dec.	0 3·1	0 3·1	5·3	5·3		959·04 (above in N.C. $)	Government Note Issue estimated end 1941, $16,000 millions.
Official Exchange Rate quoted in Chungking							
1942	0 3·0	0 3·0				1,993·56	
1943							
June	0 3·0	0 3·0				5,699·72	
Dec.	0 3·0	0 3·0				11,986·49	
1944							
Jan.	0 3·0	0 3·0				15,702·63	
Feb.	0 3·0	0 3·0				17,474·82	
Mar.	0 3·0	0 3·0				22,666·21	
Apr.	0 3·0	0 3·0				23,683·33	
May	0 3·0	0 3·0				27,633·84 (above in C.R.B. $)	

See also Fig. 40.

between \$40 and \$41 per *tou*, rising in others, at Pishan, near Chungking, for example, to \$48 per *tou*. There had also been a big rise in wages. In October 1941 coolies in Chungking were getting \$10 a day, whereas in January 1939 they were getting \$0·35. Average skilled and semi-skilled labour wages had not risen as much; they were about 16 times as high as in 1939. But mechanics, electricians, and handicraftsmen in the building trade were getting 40 to 50 times as much as they used to get. The wage level in Chêngtu approximated to that of Chungking. In Kunming and Sian it was lower; in Hengyang and Shiuchow, the war capital of Kwangtung, lower still, while there were places in Hunan and other provinces where the wage level had not risen more than 6 or 7 times. In the case of government salaries, the government has adopted a scheme of house and rice allowances, thus restricting monetary increases to about ninefold in the lowest, and about fivefold in the highest grades. On the other hand, millions of soldiers are getting considerably, if not greatly, increased pay.'

It will not have escaped the notice of the reader that the workers' cost of living index in September 1941 (the nearest date available to the outbreak of the Pacific war) was 959·04 (1936 = 100), while in May 1944 it was 27,633·84. Even allowing for some difference between the purchasing power of the national currency and 'C.R.B.' dollars, no further comment could add to the picture which these figures supply.

The National Budget

In announcing the new currency regulations in November 1935 the Chinese government, then domiciled at Nanking and in control of the whole of China, stated that plans for financial adjustment had been made whereby the National Budget would be balanced in eighteen months. Under normal conditions this should, of course, be a corollary of any managed currency system, and in view of the dénouement it is only fair to the Chinese government to state that praiseworthy efforts were immediately directed toward bringing the government's revenue and expenditure under control. It may be of interest to quote the figures of the National Budget for the twenty-sixth fiscal year (1 July 1937 to 30 June 1938), which was estimated to balance at the then considerable total of N.C. \$1,000,649,496, although the figures are now of but academic interest.

National Budget for 26th Fiscal Year
(1 July 1937 to 30 June 1938)

Revenue	
Customs	$369,267,522
Salt	228,625,553
Taxes—	
Tobacco and Wine	21,046,642
Stamp	11,300,000
Consolidated	175,617,650
Mining	4,751,638
Stock Exchange	170,000
Income	25,000,000
Inheritance (new)	2,000,000
Bank Note Issues	1,600,000
Receipts—	
Government Property	4,143,913
Government Enterprise	24,134,307
Government Administration	13,847,094
Government Business	16,073,787
Remittances—	
(Provinces and Municipalities)	3,680,040
Miscellaneous	99,391,350
	$1,000,649,496

Expenditure	
Party	$7,311,440
National Government	17,962,546
Military	392,499,952
Ministries, Commissions, etc.—	
Interior	6,188,932
Foreign	9,435,816
Finance	69,232,090
Education	42,934,368
Judicial	4,315,849
Industrial	3,072,312
Communications	5,056,595
Mongolian and Tibetan	2,500,362
Subsidies	31,015,076
Compensation and Awards	6,678,497
Loan Service	324,693,754
Reconstruction	70,000,000
Reserve Relief Fund	3,000,000
Second Reserve Fund	4,751,907
	$1,000,649,496

The measure of this budget should be viewed in relation to the purchasing power of the dollar at the time it was drawn up, and at the present time. No later budget figures are available for publication, but each succeeding year of war has doubtless increased the discrepancy between revenue and expenditure. The phenomenal growth of the note issue and the enormous increase in the average of wholesale prices indicate an advanced stage of inflation, and although China, under normal conditions, possesses great recuperative powers, these conditions are not in sight, and it is doubtful—to say the least—whether the currency as at present constituted will survive the great ordeal to which it has been subjected.

The central government continues to make great efforts to control prices and to adopt all possible measures to improve the position; but their task is formidable. Practically all the Customs revenue of the ports and a large proportion of the salt taxes, which together formerly represented 60 per cent. of the total revenues accruing to the central government, are retained by the Nanking puppet administration. Customs collections in 'Free China' were stated to have amounted to about $1,000,000,000 in 1943, and no doubt the revenue from the salt tax also increased greatly; but the

two together cannot have amounted to more than a fraction of the budget revenue for that year. The greatest step forward in matching expenditure with revenue was taken in July 1941, when the land tax was transferred from the provincial to the national revenue, and collection in kind instituted. Since then various other taxes have also been collected in kind and by this means the revenue accruing from these sources has been increased manyfold, while at the same time the collected stores of grain and other commodities can be retained by the Government until seasonal surpluses are used up and released opportunely to assist in stabilizing prices. Direct taxes, which formerly contributed a very small part toward the nation's revenue, have been greatly increased, and now income, excess profits, and inheritance taxes, together with the business tax taken over from the provincial governments in 1942, represent a growing figure, if not a growing proportion—owing to the enormous increase in the yield from the land tax—of the total revenue. Many other steps have been taken to increase the revenue, but the Chinese government has neither the control over the people nor the developed civil service to grade all types of taxation to the measure of its necessities in the midst of war, or the ability to pay of the individual citizens, and a large budget deficit, presently estimated at half the total expenditure, is inevitable so long as Sino-Japanese hostilities continue.

China's difficulties in financing the war effort do not end there, for owing to the comparatively under-developed state of the banking system, it is difficult, if not impossible, to drain off the surplus purchasing power of the people by means of loans and similar devices. A great strain, therefore, continues to be thrown upon the currency; but the grant of large credits [1] in sterling and U.S.

[1] £50,000,000 and U.S. $500,000,000 respectively in 1942, although the grant of the sterling credit was not confirmed until May 1944.

It may be of interest to list the loans granted to China since the beginning of the Sino-Japanese conflict by

The British Government

1938	Export Trade Loan ..	£5,000,000
1939	Currency Stabilization Loan (Hong-Kong and Chartered Banks)	5,000,000
1941	Currency Stabilization Loan	5,000,000
1941	Credit Loan	5,000,000
1942	Credit Loan	50,000,000

The United States Government

1938	Wood Oil Loan	U.S. $25,000,000
1940	Tin Loan	20,000,000
1940	Wolfram Loan ..	25,000,000
1941	Currency Stabilization Loan	50,000,000
1941	Credit Loan	50,000,000
1941	Mineral Products Loan	60,000,000
1942	Credit Loan	500,000,000

dollars by the British and United States governments for use in strengthening the currency has enabled the Chinese government to issue loans in foreign as well as local currency, to issue Customs Gold Unit[1] notes, and to sell gold, with a view to reducing the total of local currency notes in circulation. By such means, aided by concrete measures to control prices and enforce existing laws against speculation in and hoarding of commodities, the Chinese government are endeavouring to maintain confidence in the currency in 'Free China.' Under present conditions, direct support of the kind extended by the Chinese Currency Stabilization Board is no longer practicable and the board was accordingly dissolved on 1 December 1943. Its functions were assumed by the Commission for the Control of Foreign Exchange Assets, which has been placed under the direction of the Ministry of Finance.

General Conclusions

When hostilities come to an end in the Far East, China will face many problems; but none more urgent than the re-establishment of a stable currency, suitable to the needs of her vast territory. The existing currency has become cumbrous and very expensive. Notes of one, and even of five dollars, are as so many cents, and barter between provinces and individuals is widespread and inescapable, with all its attendant hindrances to enterprise. China has, therefore, completed the circle. From barter in far-off prehistoric times, she has returned to barter. The currency notes issued by the Japanese in China and by the puppet governments at Nanking and Peiping—not to mention 'Manchukuo'—which together may approach the total of the National Government issues, will further complicate the position at the end of the war. While, therefore, eventual liquidation of the Chinese national currency into a new currency, having a higher unit value, would appear to be a natural development, it is doubtful whether the Chinese government, unaided, would find it possible to recreate, within an acceptable period, sufficient confidence in any proposed new currency to command success.

China's recuperative powers are proverbial and, provided national unity can be preserved in the immediate post-war period, much may be accomplished; but the country will be left in an impoverished state and a great deal of pioneer work will have to be done before

[1] Customs Gold Unit = 60·1866 centigrams of pure gold.

any material improvement upon the standards which existed prior to the Sino-Japanese hostilities can possibly be achieved. Henry A. Wallace, recently vice-president of the United States, is reported to have stated in a speech in Chungking, delivered on 22 June 1944:

'An efficient agricultural civilization underlies our (*i.e.* the U.S.A.) industrial civilization and is a fundamental prerequisite to that boundless future of human power over environment which science opens to us. . . . China can, if she will, do in fifteen years what it took the United States forty to do—that is, increase her agricultural efficiency by 50 per cent., and thereby make possible a rapid and economically sound industrialization going hand-in-hand with agricultural prosperity.'

But this savours of over-simplification. The position in China when hostilities in the Far East come to an end will not be analogous to that of the United States in any period of its history, if only from the point of view of population, and unless much that China requires to secure advancement lies ready to hand within her own borders, as was so largely the case in the United States, external assistance will have to be extended if reasonably fast progress is to be assured.

Until the end of 1941 industrial production in 'Free China' kept pace with ascending prices; but in 1942 production fell away, and it is safe to say that few industries have since operated at anything approaching full capacity. The main causes of the falling off are rising prices of raw materials, due to a permanent flight from the currency into commodities and lack of transport. Similar conditions apparently prevail in occupied China, and it is reported that most of the industrial machinery there, including the looms and spindles of all but two of the textile mills which formerly operated in Shanghai, have been transferred to Japan.

In the post-war period, therefore, China will start from zero. With no stable currency, and possessing few industries, unless in the progress of the war industries can be built up with the assistance of her allies, China will be entirely dependent upon the fruits of agriculture and such raw materials as are available within the country to pay for essential imports. Without foreign assistance, therefore, much time would have to elapse before the industrialization, upon which the more progressive elements in China have set their hearts, could even be commenced upon any large scale.

China at present has outstanding loans equivalent to about U.S. $1,330,000,000, borrowed from the United States, Britain, and the U.S.S.R. Mention is made of this fact, not because these countries are likely to prove importunate creditors, but because, being already vastly interested in China's return to prosperity, it requires little imagination to realize that, in their search for markets overseas in the post-war period, they will desire to play an honourable part in the orderly development of China, both agriculturally and industrially. Trade and commerce after the war will remain the life-blood of Great Britain and the British Empire. China will require machinery of all kinds, electric plants, water works, telephone systems, railway extensions, etc., and side by side with the United States, Great Britain should be able to assist in placing these at her disposal. In the past, the long-term finance required for such ventures proved a serious stumbling-block in a country where stability was non-existent and the banking system comparatively undeveloped. The position is unlikely to be more favourable in the immediate post-war period; but provided established government prevails in China, it should not prove impossible for these two nations, with the experience gained during the course of the war, to devise means whereby the risks involved—for until China regains economic stability, the risk of loss must remain a factor—could be apportioned on an equitable basis.

But for China there can be no easy road to recovery, and until the currency is re-established on a secure and stable basis, supplies from foreign sources are likely to be confined to providing for immediate and pressing needs. In the light of recent experience, and of the lessons of the centuries, the re-establishment of the currency would only be possible after peace and tranquillity within the country had been restored, and even so, if it is to be acceptable on an international basis, effective foreign help would undoubtedly be required to achieve notable results within a reasonable space of time. Speculation upon the future of the currency under present circumstances is likely to prove unprofitable; but whether the solution of China's monetary troubles will eventually turn out to be the re-introduction of silver, or a new currency, the early restoration of progress and prosperity to China must remain the aim of all great nations of the world and the best augury for China's economic recovery.

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Chapter VII

THE PORTS OF SOUTH CHINA

Introduction : Tengyueh : Szemao : Mengtsz : Lungchow : Pakhoi : Kiungchow (Hoihow) : Luichow : Nanning : Wuchow : Samshui : Kongmoon : Lappa : Kowloon : Canton : Swatow : Amoy : Foochow : Santuao : Wenchow : Ningpo : Hangchow : Soochow.

INTRODUCTION

China Proper, considering the length of its coastline, is singularly deficient in harbours. The southern and south-eastern coast from the Tongking frontier to Hangchow wan is characterized by numerous estuaries and inlets, at many points sheltered by a fringe of islands; many of the harbours are, however, subject to a constant accumulation of silt and mud, which renders them shallow and cramped. Amoy, Santuao, and Hong Kong are fortunate in having unlimited deep-water accommodation. The mainland ports are further handicapped by having their hinterlands restricted by mountainous country, and hence inadequate means of communication. The predominance of Canton, which is partly due to historical factors, is largely attributable to the fact that it has, by virtue of the Si kiang and Canton delta waterways system, better communications over a larger area than any of its rivals. Santuao, on the other hand, is so inaccessible from the interior that it has never been able to realize its natural advantages.

From Hangchow wan northwards the coastline, apart from the rugged Shantung peninsula, is low, with few indentations, constantly extending seawards with the sediments deposited by the Yangtze kiang, the Hwang ho, and the numerous streams flowing into the Yellow sea and the Gulf of Pohai. The river mouths are choked with silt and unusable by large ocean-going vessels, without conservancy work on a large scale. On the other hand, the hinterlands of the North China Plain and of the Yangtze valley are both extensive and rich, and have easier lines of communication with the coast than South China. The growth of Tientsin and Shanghai has been in response to the demands of these hinterlands in spite of the difficulties of navigation caused by deposition of silt, remedied only by continuous hard work on the part of the Hai Ho Conservancy Commission and the Whangpoo Conservancy Board. Tsingtao,

the chief port of the Shantung peninsula, is the best harbour of all China, but has been handicapped by long and inadequate lines of communication with the North China Plain.

Political and historical factors have played an unusually large part in the development of Chinese ports. The isolation policy of the Manchu emperors, and the restriction of early trade to Canton, delayed considerably the growth of other ports. The treaty port system favoured such places at the expense of any others which might have been geographically more advantageous.

There has been little construction of artificial aids to port development. Chinwangtao, Chefoo, Tsingtao, and Lienyunchiang alone have harbour works on modern lines, but even these are comparable only to small European ports. Conservancy works have, however, aided considerably in the development of Shanghai, Tientsin, Canton, and Foochow. Chinese ports have few modern facilities for the berthing of ships and the handling of cargo. At small seaports like Lungkow, Pakhoi, and Kiungchow ships anchor off shore and all goods are loaded and discharged by lighters. Even at Shanghai, which is amongst the great ports of the world, and at Tientsin, cranage facilities are very meagre, and small craft play an important part in handling cargo. The river ports of the Yangtze kiang and the Si kiang which handle a considerable amount of shipping traffic, have little more accommodation than pontoons and hulks moored to stone or concrete bunds. At the smaller ports storage and transport facilities are entirely inadequate, and supplies of coal, fuel oil, ships' stores, and, above all, of safe drinking water may be not merely insufficient but entirely absent.

Climatic hazards have as important an influence upon the use of Chinese ports as in the case of other countries. Gales, which often accompany the winter monsoon, may raise strong seas which complicate the entrance of ships into ports or make lighterage impossible, especially in North China. Though the summer monsoon may blow strongly at times in South China, it brings fewer gales and squalls and more calm weather. The most dangerous hazard to shipping in South China are typhoons, of which an average four or five annually are experienced along the coast from June to September. In the Gulfs of Pohai and Liaotung, especially at the mouth of the Hai ho, ice may be experienced from November to March, and occasionally is so severe as to interfere seriously with shipping. Fog and poor visibility are most

Plate 57. The waterfront, Pakhoi, Kwangtung

Plate 58. Main Street, Hochow

Hochow has undergone considerable modernization, with some wide concrete-surfaced streets.

Plate 59. Kongmoon, Kwangtung
A view of part of Kongmoon; an oil installation can be seen in the centre, with paddy fields in the foreground.

Plate 60. Wuchow, Kwangsi
The waterfront of the Kwei kiang at Wuchow during high level; the confluence with the Si kiang can be seen at the extreme right.

frequent in winter in North China, and during the *crachin* period of spring in South China.[1]

In the South China sea tides are predominantly diurnal in character, that is, one high and one low tide every twenty-four hours. Farther north, though diurnal inequality is noticeable and important when the moon is in high declination, it is not sufficient to cause single-day tides, and semi-diurnal tides, with two low and two high waters daily, are prevalent.

The responsible port authority for the great majority of Chinese ports is the Maritime Customs. Notable exceptions are Chinwangtao, owned and operated by the K.M.A. (Kailan Mining Administration) and Lienyunchiang, the Lunghai Railway's terminal port. The conservancy bodies, particularly the Whangpoo Conservancy Board in the case of Shanghai and the Hai Ho Conservancy Commission in the case of Tientsin, municipal governments, and port development authorities have in various cases parts to play in port administration.

The official statistics relating to port traffic in China Proper are issued by the Maritime Customs, which lists forty ports, arranged as follows:

Ports	Number
Southern frontier (Tengyueh to Lungchow) ..	4
Southern coast and West river (Pakhoi to Swatow)	14
Central coast (Wenchow to Shanghai)	5
Lower Yangtze (Chinkiang to Hankow)	5
Upper Yangtze (Yochow to Chungking)	6
North China (Tsingtao to Chinwangtao)	6

Only Lungchow of the southern frontier ports is a 'port' in the normal sense of the word, the other three being more correctly inland marts used for customs entry. Kowloon, Lappa, and Luichow also are not of themselves ports, but rather customs districts designed to trade from Hong Kong, Macao, and Kwangchowwan respectively. A description of the trade of each of these six 'ports' is given in the following account to complete the general picture. In addition a description is given of the Lunghai Railway port of Lienyunchiang (Laoyao), the statistics of whose trade is included in the returns of Tsingtao. The Maritime Customs *Report of the Marine Department* lists additional minor ports to the number of about 140, mainly junk and fishing ports, of which no account is given here.

Since the Japanese occupied the majority of the coastal and river ports in 1937 and 1938, the ensuing description, particularly with

[1] For a full account of the climatic conditions in China, see vol. i, Chap. viii *passim*.

Port Activities, 1936

Port	Domestic Trade	Foreign Trade	
	Shipping	Shipping	Value
	tons	tons	$
Southern Frontier Ports			
Tengyueh	—	—	4,967,558
Szemao	—	—	1,271,598
Mengtsz	—	—	31,780,106
Lungchow	12,902	1,689	225,244
Southern Coast and West River Ports			
Pakhoi	286,754	264,054	2,150,814
Kiungchow	360,144	922,668	5,437,304
Luichow	736,818	470,146	2,616,343
Nanning	67,998	—	21,588
Wuchow	113,748	873,018	20,924,317
Samshui	945,709	865,359	1,206,800
Kongmoon	—	1,211,927	6,643,951
Lappa	1,022,483	747,106	6,629,409
Kowloon	—	1,757,245	63,795,580
Canton	2,785,351	5,553,621	73,392,291
Swatow	2,636,164	3,993,678	52,845,136
Amoy	2,743,183	2,247,629	17,298,456
Foochow	1,657,510	427,003	9,628,241
Santuao	79,592	9,781	127,765
Central Coast Ports			
Wenchow	194,973	7,238	604,166
Ningpo	2,967,904	21,532	1,850,950
Hangchow	78,795	—	2,808,962
Soochow	104,814	—	4,450,166
Shanghai	15,603,054	16,207,205	917,456,595
Lower Yangtze Ports			
Chinkiang	8,131,887	99,812	7,119,203
Nanking	10,646,819	242,617	19,078,445
Wuhu	10,250,450	526,689	5,362,745
Kiukiang	9,519,056	38,814	4,243,680
Hankow	7,268,232	842,217	46,433,714
Upper Yangtze Ports			
Yochow	1,832,222	5,366	424,926
Changsha	485,336	—	5,700,310
Shasi	1,263,690	—	146,097
Ichang	1,366,631	—	192,896
Wanhsien	980,268	—	38,096
Chungking	542,312	—	2,426,563
North China Ports			
Tsingtao	4,195,445	3,340,761	106,284,770
Weihaiwei	2,354,796	418,074	3,560,282
Chefoo	3,425,826	815,466	16,554,174
Lungkow	475,359	257,033	4,612,606
Tientsin	3,110,530	2,054,717	190,474,054
Chinwangtao	1,538,539	1,011,259	10,528,232
Total	99,785,294	45,233,724	1,651,314,133

Source: Maritime Customs, *The Trade of China*, 1936, pp. 106, 118 (Shanghai, 1937)

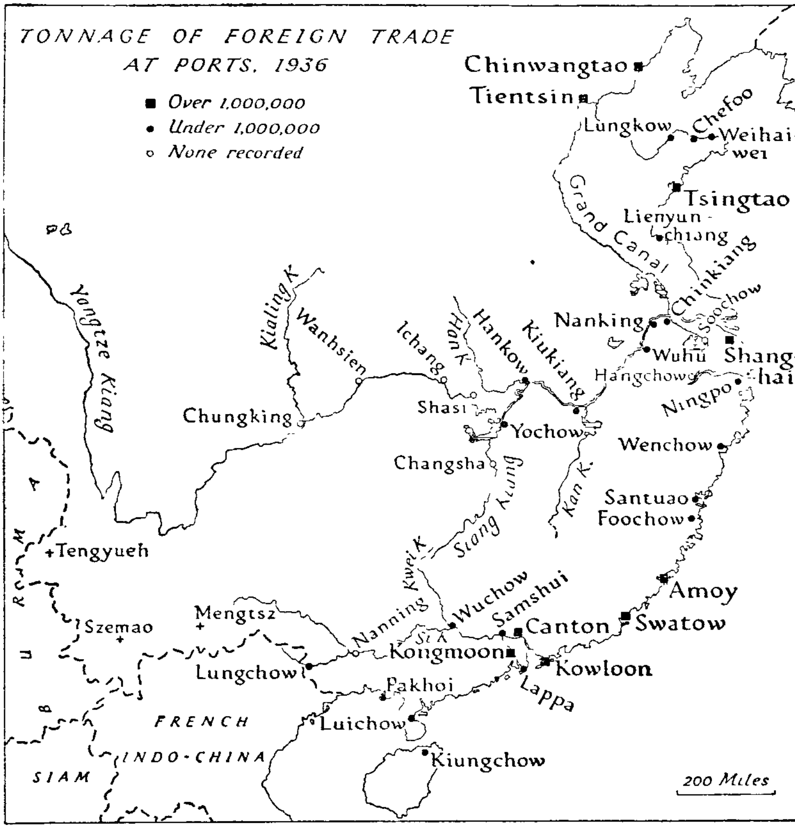


Fig. 41. Tonnage of foreign trade at ports, 1936

Based on Maritime Customs, *The Trade of China*, 1936, p. 118 (Shanghai, 1937). The positions of Tengyueh, Szemao and Mengtsz, which are not 'ports' in the accepted sense, have been indicated.

regard to port facilities and communications, is largely that of the ports as they were before the outbreak of war in July 1937, though reference is occasionally made to Japanese-sponsored developments since that date.

Tengyueh

Lat. 24° 45′ N., long. 98° 30′ E. Population, *c.* 50,000

Tengyueh, an important market of western Yunnan, is 35 miles from the frontier with Burma, but over 100 miles by road. The town is situated on a small tributary of the Taiping kiang, which flows into the Irrawaddy a few miles above the Burmese town of Bhamo.

The Town

Tengyueh is a walled town situated in a fertile valley at an elevation of 5,356 ft., with mountains over 12,000 ft. high some 15 miles to the north. The town, which has few modern buildings, is almost entirely built outside the walls, within which there are only a few government offices and temples. The town resembles Tali and Paoshan, and is laid out on a geometrical pattern with some very broad streets lined by rows of trees. It is the most westerly outpost of Chinese colonization in this part of Yunnan, the country to the west and south-west being inhabited by Shan tribesmen. Tengyueh was opened to foreign trade in 1902 under the Burma Agreement of 1897 between Great Britain and China, to encourage trade between Burma and Yunnan. Unlike other centres of Yunnan it did not suffer greatly during the Moslem revolt headed by the Tu Wen-hsin in 1873 (see vol. ii, p. 41).

Trade

In 1936 the total value of the trade of Tengyueh was just under \$5·0 million, of which all but a very small fraction was in foreign trade, largely exports. The trade of the town is conducted mainly by mule caravans, which bring in commodities from the neighbouring countryside and travel with goods for export along the caravan route to Bhamo in Burma. Raw silk was by far the most important export, amounting in value to \$3·5 million; the leading import was Burmese raw cotton and cotton yarn. The export trade was entirely with Burma, the import trade mainly with Burma, Belgium, and India.

The outbreak of the Sino-Japanese war in 1937, which closed many of the normal trade channels and stimulated trade along overland routes, in particular the Burma Road, was responsible for a steady increase in the trade of Tengyueh. The foreign trade reflected this remarkable improvement as follows:

Foreign Trade of Tengyueh, 1937–41 (*millions of dollars*)

1937	4·7
1938	5·8
1939	7·1
1940	12·6
1941 (to September)	78·2

The cutting of the Burma Road and the capture of Tengyueh itself by the Japanese in 1942 brought all foreign trade to a standstill.

Communications

Tengyueh is served only by roads of poor quality. The mule caravan route runs from Paoshan through Tengyueh and down the Taiping valley through Manyun to Bhamo. This is a rough track, motorable only for the last 30 miles to Bhamo and impassable after heavy rains, but before the Japanese occupation of Burma the Chinese were planning a motor road from Tengyueh to Bhamo. A track also connects Tengyueh with the Burma Road at Lungling, some 55 miles south of Tengyueh; it was proposed to build a motor road from Lungling to Myitkyina in Burma, via Tengyueh.

Szemao

Lat. 22° 47′ N., long. 101° 04′ E. Population, *c.* 20,000.

Szemao, a district centre of southern Yunnan, lies in the mountainous country between the basins of the upper Red river and the Mekong.

The Town

Szemao is a walled city built on gently rising ground overlooking a well-cultivated plain, at about 4,700 ft. above sea level. It has the reputation of being one of the unhealthiest towns in Yunnan and is particularly subject to malaria; its population has dropped from 100,000 in 1925 to 20,000 in 1936. Szemao was opened to foreign trade with French Indo-China in 1895, and with Burma in 1896. The district is mainly agricultural, but there is a local home industry of cotton-weaving by hand looms.

Trade

Situated as it is in one of the most inaccessible parts of China, Szemao has developed little as a trading centre. Its trade is carried on over mountain passes with Burma and French Indo-China mainly by mule caravan, and is liable to frequent interruptions by heavy rains which render tracks impassable and by the activities of bandits. In 1936 the total value of the trade, of which only a very small part was domestic, amounted to \$1·3 million.

Imports, which constituted about two-thirds of the foreign trade, were mainly raw cotton, kerosine, and cotton yarn and cotton goods from Burma; the bulk of the exports, chiefly tea, lead bars, and some camphor, also went to Burma.

In common with the other southern frontier ports the foreign trade of Szemao improved considerably from 1937 to 1941, amounting to $4·9 million from January to September 1941.

Communications

Previous to the outbreak of the Sino-Japanese war the only means of communication with Szemao were mule tracks, north to Kunming, south and west into Burma, and south-west into Indo-China. In 1941 a motor road of poor quality was completed from Kunming via Szemao and Puerh to Kengtung in Burma, to connect with a rail-head of the Burmese railway system at Taunggyi.

MENGTSZ

Lat. 23° 20′ N., long. 103° 23′ E. Population, *c.* 100,000.

Mengtsz, a district centre of south-eastern Yunnan, lies in the mountainous uplands between the basins of the upper Red river and of the Hungshui kiang.

The Town

The city is situated at an elevation of 4,280 ft. on a cultivated plateau surrounded by picturesque mountains. Mengtsz was opened to foreign trade in 1887 according to the provisions of the Treaty of Tientsin between China and France. The extension of the railway to Kunming, the present customs and commercial headquarters of the Mengtsz district, has had a serious effect on Mengtsz, which is now of little more than minor importance.

Trade

In 1936 the total trade of the Mengtsz district amounted to $53·3 million, made up as follows:

	Imports	Exports	Total
Foreign trade	8·1	23·7	31·8
Domestic trade	18·2	3·3	21·5

The chief imports were machinery and tools, rice, cotton yarn and piece-goods, cigarettes and mineral oils. The most important export is tin from the mines at Kochiu, 20 miles to the west of Mengtsz; other exports included tungsten, zinc, hides and skins, and leather and wool. Germany, U.S.A., Netherlands East Indies,

and France were the leading importing countries, while the bulk of the exports went to Hong Kong.

The closing of the lower Yangtze and southern ports resulted in considerable expansion in the foreign trade of Mengtsz; there was a significant redirection of products from Szechwan for export to Hong Kong, Great Britain, and French Indo-China, especially wood-oil and pig bristles, and an increase in exports of metal ores. The following table indicates the increasing importance of Mengtsz after 1937:

Foreign Trade, Mengtsz, 1937–41 (millions of dollars)

1937	43·8
1938	52·2
1939	56·9
1940	81·3
1941 (January–September) ..	170·5

Communications

The nearest station on the metre-gauge Yunnan Railway is several miles from Mengtsz, but there is a branch line with a 2-ft. gauge passing through Mengtsz to Shihping and Kochiu in the tin-mining area (Plates 40, 135).

A branch earth-surfaced road runs north-west from Mengtsz to Amichow (Kaiyuan) where a surfaced road leads north to Kunming. Southwards into French Indo-China there are only trails over mountainous terrain.

LUNGCHOW

Lat. 22° 22′ N., long. 106° 54′ E.	Population (1929), 14,796
Admiralty chart 1015	Plate 160

Lungchow is a river port on the Tso (Li) kiang 205 miles upstream from Nanning. Lungchow is about 12 miles from the nearest point on the French Indo-China frontier and is about 30 miles by road from Dongdang on the Hanoi-Nacham railway.

Approach and Access

The Tso kiang is navigable by shallow draught launches during the high-water season and by vessels drawing 1 ft. or less at other times. The river is shallow and broken by numerous rapids, and on the high-water seasons rapid rises are frequent. There is no good anchorage at Lungchow, the best being near the iron suspension bridge across the river.

The Town

Lungchow is a walled city surrounded by picturesque hills, but the walls are being demolished to make a circular road. There are few modern buildings, apart from the Customs house, the French consulate, and mission buildings; the town also has a small electricity plant. Lungchow was opened as a treaty port in 1889, after the Sino-French war of 1884, and has proved a useful back-door to China when trade was interrupted at other treaty ports of the south.

Trade

In 1936 the value of the foreign trade of Lungchow was very small, amounting only to $225,244, of which exports accounted for nearly 80 per cent.; no domestic trade was recorded. The tonnage entering and leaving the port was stated to be 14,591, of which about seven-eighths was engaged in domestic trade; the bulk of the foreign trade was carried on by land routes. Antimony ore and aniseed oil for export to French Indo-China are the only important articles of trade handled. The Sino-Japanese hostilities added to the prosperity of Lungchow, and the following figures show the remarkable increase in trade up to 1939, which resulted from the cutting off the normal trade channels through the spread of military operations to the south:

Foreign Trade, Lungchow, 1937–41 (*millions of dollars*)

1937	0·4
1938	0·7
1939	94·0
1940	16·1
1941 (January–September)	1·8

In 1939 Lungchow's share of China's foreign trade amounted to the unusually high figure of 3·96 per cent.; much of the increase was accounted for by greatly increased exports to French Indo-China, but there were in addition large imports from U.S.A. The Japanese occupation of Lungchow in July 1940 put an end to this trade boom, and though the town was recaptured by the Chinese three months later, the Japanese seizure of French Indo-China in the summer of 1941 cut Lungchow's most important lines of communication with the outside world.

Communications

Lungchow is the terminus of the Nanning highway (see p. 244); other roads giving communication with French Indo-China run

north-west to Caobang, and south-west via Pinghsiang to Dongdang. Junks and motor boats link Lungchow with the Si kiang ports, but upstream traffic is by small junks, sampans, and rafts. The South-western Aviation Corporation used Lungchow as a port of call on the Hong Kong–Hanoi service up to 1938.

Pakhoi

Lat. 21° 25′ N., long. 109° 02′ E. Admiralty charts 776, 2062

Population (1934 estimate), 40,000 Fig. 42. Plate 57

Pakhoi, a port of call on the Hong Kong–Hanoi sea route, is situated on the eastern shore of a bay on the north side of the Gulf of Tongking.

Approach and Access

South of Kwantou point is a shallow bank with depths of less than 18 ft. over it; between this bank and a shoal of similar depth farther west is the entrance channel, which is here about 1 mile wide but narrows as the anchorage is approached. Fishing stakes, extending north-west from Tikok village, further reduce the width of the channel. Depths of 19½ ft. are found in the entrance channel, but the whole offshore area of south-western Kwangtung has been inadequately surveyed and accurate information is not always possible.

Detailed Description

The best anchorages are off Tikok in 24 to 30 ft. (7·3 to 9·1 m.) and in 18 ft. (5·5 m.) farther to the east.

The anchorage, which faces due north, is much exposed to the northerly winds of winter, which interfere materially with loading and discharge of cargo. Typhoons may occur in any month in the Gulf of Tongking but are rare from January to April.

In Pakhoi there is a single tide daily, with a spring rise of 14¾ ft. and a neap rise of 5¾ ft.; tidal streams set through the anchorage at a rate of 2 knots at spring tides and ½ knot at neaps.

Port Facilities

There are very inadequate facilities at Pakhoi and all vessels moor to their own anchors; discharge and loading takes place by means of lighters, sampans, and other small craft. No stocks of coal are kept, and there are no repair facilities. A small quantity of fuel oil

and limited quantities of fresh provisions and water are available. There are a few small godowns.

The Town

Pakhoi stretches along the waterfront in a scattered fashion for some distance. The town is dirty but has been partly modernized, and the main street, which runs from west to east, has been widened and laid with concrete. Electric light is supplied by a small Diesel plant situated at the east end of the town. Pakhoi has no modern sanitation system, but there are three small general hospitals and a leper hospital. The water supply, mainly from rivers and wells, is of poor quality. There is a small poorly-equipped fire-brigade. Apart from mission representatives, few foreigners ever reside there. Pakhoi was opened to foreign trade in 1877, as provided for by the Chefoo Agreement, concluded between Great Britain and China in 1876.

Trade

Since the opening and development of the Si kiang ports Pakhoi as a trading centre has never been of much importance, being handicapped by its shallow harbour and lack of adequate port facilities and communications ; as a fishing centre it is still of some significance. In 1936 the total gross tonnage entered and cleared was 550,808, of which slightly more than half was in domestic trade. The total value of trade in 1937 was \$8·2 million, of which \$4·5 million was in domestic trade. Imports include mineral oils, cereals, and sundry manufactured articles ; livestock and hides, wood oil, ground-nut oil, firewood, and fishery products feature most prominently among the exports.

The leading countries in Pakhoi's import trade were French Indo-China, Hong Kong, Belgium, Netherlands East Indies, and U.S.A. ; Hong Kong dominates the export trade. After the opening of Sino-Japanese hostilities in 1937 the trade of Pakhoi increased considerably up to 1939, when its share of China's foreign trade had increased from less than 0·1 per cent. to just over 0·8 per cent., but the occupation of the port by Japan in 1940 and military operations in 1940–41 caused a serious decline.

Communications

Pakhoi has no rail communications with the interior, but a new motor road runs north to Limchow (to link up with the Paksha–

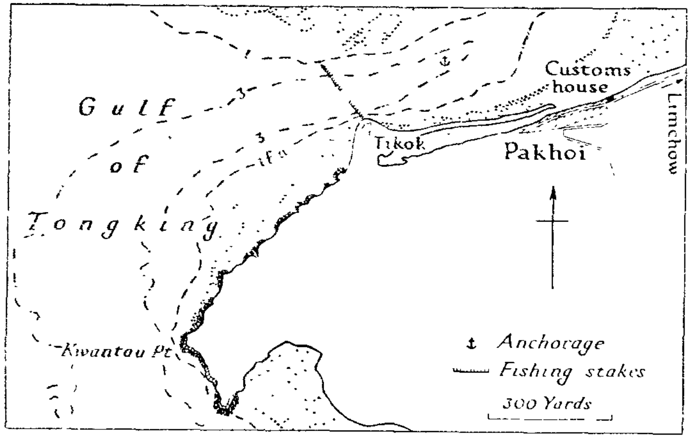


Fig. 42. Pakhoi

The port plans have been based on: (i) British Admiralty charts; (ii) Chinese Admiralty charts; (iii) Maritime Customs charts; (iv) Maritime Customs, *Report of the Marine Department*, 1937, plans (Shanghai, 1938); and (v) official sources.

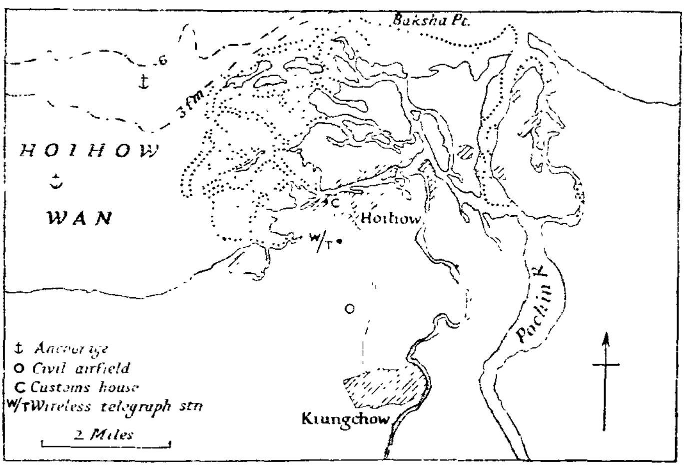


Fig. 43 Kiungchow (Hoihow)

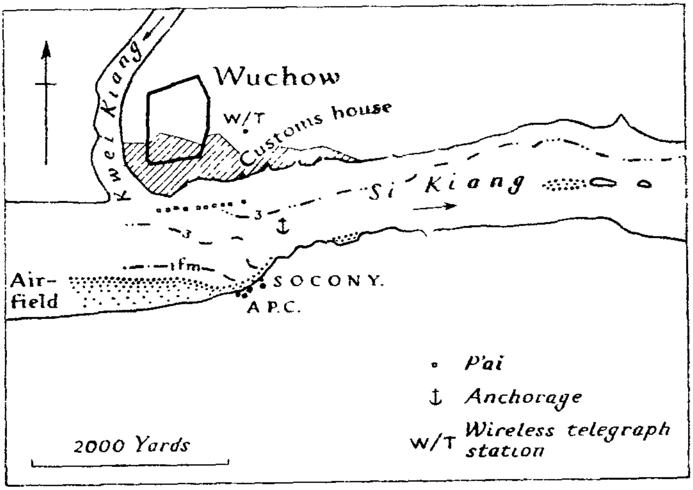


Fig. 44. Wuchow

A.P.C., Asiatic Petroleum Co.; S.O.C.O.N.Y., Standard-Vacuum Oil Co.

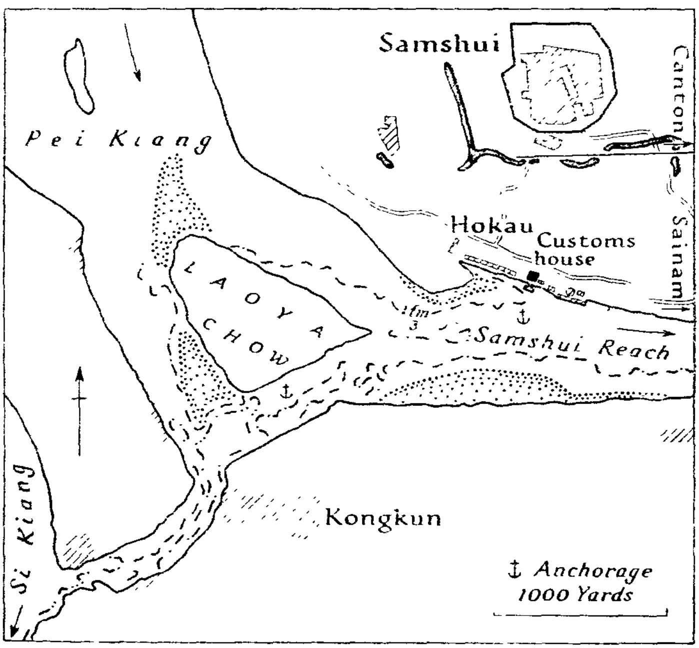


Fig. 45. Samshui

Yamchow highway) and thence to Namhong on the Si kiang, 29 miles distant; a minor road runs west to the village of Namvan. A motor-bus service is in operation to Lingshan, via Limchow. A telegraph line, operated by the Ministry of Communications, runs to Canton, and thence messages can be sent to all parts of China. The airfield immediately to the east of the town was used up to 1938 by the South-western Aviation Corporation in their Canton–Kiungchow–Pakhoi service. There is a military W/T station, sometimes used for commercial purposes.

Kiungchow (Hoihow)

Lat. 20° 03′ N., long. 110° 20′ E.	Population, Kiungchow (1935), 45,757 Hoihow (1939), 52,000
Admiralty charts 37, 76	Fig. 43. Plate 58

Kiungchow, the administrative centre and capital of Hainan, is situated about 2½ miles inland from its port, Hoihow, the chief trading and commercial centre of the islands. Hoihow is on the delta of the Pochin (Pakcheong) river, which flows into Hainan strait, opposite Liuchow peninsula.

Approach and Access

Hoihow bay, which lies to the west of the Pochin delta, is approached through the water of Hainan strait. The western end of the strait is clear of dangers and presents little difficulty to shipping, but at the eastern end there are several dangerous shoals with channels between. These channels are awkward to navigate at night and during periods of poor visibility, and have been buoyed by the Japanese for shipping visiting Hoihow and small ports nearby.

The Pochin delta is composed of low islands, mud flats, and sandbanks, bordered on the west side by a spit. These are constantly changing position, and make navigation difficult; fishing stakes, which are generally found off Baksha point, the northern tip of the delta, present additional hazards to shipping. The spit is pierced by several openings, but is generally rounded at its southern end; inside the spit, where there is a steady accumulation of silt, the water is very shallow, and only at high tide can small boats and sampans approach Hoihow, which is situated on the south side of Hoihow river, a delta channel, which is also rapidly silting up. There are several shoals in Hoihow bay, of which Dale bank, with a least depth of 4 ft., is the most significant.

Tides at Hoihow are subject to a considerable diurnal inequality and are frequently puzzling to sailors; there is generally one high and one low tide in the day. The rise at mean high-water springs is 10 ft., and at mean high-water neaps is 6 ft.; tidal streams run in and out of the harbour in a NE–SW direction at rates of $1\frac{1}{2}$ to 2 knots.

The bay is exposed to the north-east, and during the winter monsoon a strong swell rises in the anchorage which makes the working of cargo difficult. Fog is very prevalent during the *crachin* period, from February to April (see vol. i, p. 224), and typhoons occur in the summer months.

Detailed Description

Hoihow is an open roadstead, all vessels anchoring at various points outside the spit in depths of 4–6 fm. in good holding ground. Junks and small craft anchor nearer the south shore of the bay in a depth of 10 ft. Cargo is unloaded from large merchant ships at anchor into small boats and sampans which have a difficult journey of 2 or 3 miles to Hoihow. At Hoihow there is a bund, 600 ft. long, with a depth of 3 ft. at the outer end at low water. There is also a concrete pier, 600 ft. long, at Shucheong east of the harbour light. Since the Japanese occupation, however, there has been much reconstruction and new building in the harbour, and dredging has been undertaken in Hoihow river.

Port Facilities

Hoihow is very poorly equipped as a port, and there are few facilities of any kind. There are small A.P.C. (Asiatic Petroleum Co.) and S.O.C.O.N.Y. (Standard-Vacuum Oil Co.) oil installations on the north bank of the river opposite the town, but the stocks of fuel oil maintained are not more than 10 tons; normally no coal for bunkering is available. Boiler water is usually taken from the river and drinking water of up to 12 tons is supplied by the Customs. The quantity of ship stores in stock are small but there are adequate supplies of fresh provisions.

The Town

Hoihow is partly surrounded by a wall, and there are large native suburbs outside the wall. Formerly a straggling town with narrow streets, it has undergone considerable modernization, and wide concrete streets with modern buildings have been constructed in

recent years. Reclamation has also been carried out along the water front.

Water is supplied from artesian wells and is not always safe to drink. Sanitary arrangements are primitive, and there are two large and four small hospitals; Hoihow is accounted the most healthy of the towns in the island. Electric light of poor quality is supplied by a small Chinese-owned power station; there is a small local fire-brigade. Hoihow has had little industrial development, but there are small local tanning, pottery, and glass making, and shoe and rope-making industries.

Kiungchow, which was opened to foreign trade in 1876 by the Treaty of Tientsin (1858), is enclosed by rectangular walls dating from the Ming period. The walls have largely fallen in disrepair and the enclosed space is only partly built over.

Trade

In 1936 shipping amounting to 1,282,812 tons, three-quarters in domestic trade, entered and cleared at Kiungchow, which is the headquarters of the Hainan customs district. The total value of the trade of the port was $15·7 million, two-thirds being domestic trade. The principal articles of import were iron goods, wheat flour, mineral oils, cement, vermicelli, beans, cotton piece-goods and yarn. The main exports were cattle, pigs, tin, sugar, fruit, leather, and rubber sheets. Imports originated in a wide variety of countries, Siam, U.S.A., Hong Kong, and Netherlands East Indies being the chief; the great bulk of exports went to Hong Kong. Hoihow is one of the three ports used for emigrant passenger traffic (see pp. 270, 276); in 1936 there were 33,283 departures, about 70 per cent. to the Straits Settlements and F.M.S., the balance to Siam. The first years of the Sino-Japanese war saw an increase of fully 50 per cent. in the foreign trade of Kiungchow, directed mainly to Hong Kong, but after the Japanese invasion of Hainan in early 1939 foreign trade fell off considerably, and in 1941 was about one-fifth of its normal value.

Communications

In peace-time regular services were maintained by shipping companies to Hong Kong, Canton, Pakhoi, Singapore, Bangkok, and Hanoi; these constituted the most important link with the outside world, though up to 1939 aeroplanes of the South-western Aviation Corporation's Canton–Nanning service used to call regularly at the airfield, 1¾ miles south of Hoihow.

No railway existed before 1939, but the Japanese have built a metre-gauge line from Hoihow to Sama on the south coast, which was planned to encircle the whole island ; short branch lines have been built from Hoihow westward to Shucheong and south-westward to Tsingmai.

The Japanese have also considerably extended the road network from Hoihow, and have built a motor road around the island ; motor-bus services run west via Kiungchow to Tamchau and south-west to Lungsui. The Pochin river is navigable for small craft of 2 ft. draught as far as Fahi.

Before the Japanese occupation there were two W/T stations, one operated by the military authorities and the other by the Ministry of Communications. There was telegraph and long-distance telephone communication between Hoihow, Kiungchow, and other major settlements on the island.

LUICHOW

(See also vol. i, Appendix v, Kwangchowwan Leased Territory)

Lat. 20° 55′ N., long. 110° 05′ E. Population, *c.* 25,000
Admiralty chart 2062

Luichow, a city on the eastern side of the Luichow peninsula, has given its name to a district of the Maritime Customs, but the head office of the district is at Macheung, 45 miles north of Luichow. The district was established in 1936 for the administration of the Customs stations dealing with trade to and from Kwangchowwan Leased Territory, previously under the control of the Pakhoi district.

The coastal regions in the Liuchow district have been very inadequately surveyed, and little accurate information is available, but sea-borne trade is carried on mainly at three small ports, Luichow itself, Shuitung, and Pokho.

Luichow, also known as Hochong, is about 2½ miles from the Luichow river, which reaches the sea on the eastern side of the Luichow peninsula. The approaches to the river are beset with shoals and local knowledge is indispensable. It is navigable for a distance of 14 miles, and is accessible to vessels of 14 ft. draught. Steamers and trading junks anchor in the river near Luichow to load and discharge cargo and a few small steamers ply up-river.

Shiutung is a large village in the Tinpak district, about 2 miles from a shallow and irregularly shaped harbour ; a bar and a number of rocks lie outside the harbour, and local knowledge is advisable.

A narrow channel, lined by mud-banks, runs through the harbour with depths of 12 ft., sufficient for steamers and junks using the port. The usual anchorage, which is sheltered at all times, is about 4 miles from the harbour entrance.

Pokho is a village in the Tinpak district on an inlet east of Tinpak. The inlet has a good anchorage, although exposed to the south, but is quite undeveloped as a harbour. A channel of least depth, 10 ft., leads through sandbanks into the inlet, where there are depths of 2¼ fm.; small steamers and large junks visit the harbour, which is concerned mainly with fishing.

None of these small ports is equipped with facilities of any kind, though a small quantity of fresh provisions and water can be had. There are small Chinese hospitals at Luichow and Shuitung, and some poor fire-fighting equipment at Shuitung.

Trade

In 1936 a total tonnage of 1,206,964 was recorded as entering and clearing within the Luichow district; about 35 per cent. of this total was in domestic trade. The total value of the trade was $3·6 million, of which less than one-third was domestic trade. The principal articles of import were kerosine, gasoline, and lubricating oils, while the chief exports were rush and straw mats, live pigs, sesamum seed, and garlic. Imports came from a wide variety of countries, U.S.A., Netherlands East Indies, Hong Kong, and Japan being the most important; exports were almost entirely to Hong Kong and Kwangchowwan, much of the latter by land routes.

The closing of normal trade routes by hostilities in South China resulted in a remarkable increase in the trade of the Luichow district, mainly in the direction of Hong Kong and Kwangchowwan, as the following figures show:

Foreign Trade, Luichow District, 1937–41
(*millions of dollars*)

1937	3·7
1938	9·5
1939	34·2
1940	151·9
1941 (January–September)	322·8

Communications

There is no railway in the Luichow district, and the few navigable rivers are not of great importance, but there is a network of roads

mostly in fair condition and widely used by motor-bus companies. The main north-south road runs south from Watlam via Luichow to the tip of the peninsula, while the main east-west runs from Yeungkong, via Shuitung and Mowming, to Luichow; short branch roads run to Fort Bayard, in the Kwangchowwan Leased Territory and other important towns.

The South-western Aviation Corporation used to operate a service from Canton to Kiungchow, which called at the airfields at Mowming (Kochow) or at Muiluk. Telegraph or long-distance telephone offices are to be found at most of the larger trading centres, while there is a military W/T station at Muiluk.

Nanning

Lat. 22° 43′ N., long. 108° 03′ E. Population (1939), 80,283
Admiralty chart 1015

Nanning (Yungning) is situated on the left bank of the Yu kiang, the most important tributary flowing into the Si kiang from the south. As a commercial and trading centre of Kwangsi it ranks a poor second to Wuchow, which is about 325 miles downstream.

Approach and Access

Above Wuchow the Si kiang is navigable by motor launches and junks drawing from 2 to 4 ft. as far as Nanning. There are few difficulties as far as Sünchow, about 106 miles upstream from Wuchow. Between Sünchow and Nanning there are banks of sand and stones and several difficult rapids, but the greatest obstacle to navigation is the Great rapid about 200 miles above Wuchow, which extends for nearly 3 miles. Water levels at Nanning vary considerably (Fig. 92), the average difference between high and low water being about 27 ft. The stream attains a rate of 2 knots at low river, and about 5 knots at high river, but may be as high as 10 knots over the Great rapid. The usual anchorage at Nanning is opposite the Customs house off the right bank of the river, where the full force of the current is not felt.

Port Facilities

Fresh provisions and water are available, while the Asiatic Petroleum Co. and the Standard-Vacuum Oil Co. keep stocks of fuel oil for motor craft on their installation on the south bank of the river above the city. There are no coaling nor repair facilities.

The Town

Nanning, lying in the centre of a wide fertile plain, is an old walled city; the walls are triangular in outline, pierced by five gates and surrounded by a moat. The enclosed area is thinly peopled, and the greater part of the inhabitants live in the suburbs, which extend on either side of the city along the river. In 1932 a programme of modernizing Nanning was begun after the establishment of the provincial government there. In the area south of the walled city headquarters for the provincial government were built and a public park, modern streets and roads laid out. Other official buildings constructed were an arsenal, a research laboratory, a veterinary institute, an observatory, a public library, and an army hospital. Electric light is supplied by a small electricity plant, and there are several mission hospitals.

Nanning was opened to foreign trade in 1907 according to the Sino-British Burma Agreement of 1897. An area to the south-east of the walled city was set aside as a foreign trading settlement, but it was never occupied owing to restrictions on owning and leasing of land imposed by the Chinese authorities, and in 1914 was taken over by the city government.

Industries

Since Nanning became the provincial capital some small industrial concerns have been developed and include a textile mill, a leather factory, a refrigerating plant, and a government printing press.

Trade

Before the opening of Wuchow, Nanning was the most important port on the Si kiang but has since declined as a centre of trade. The direct foreign trade of Nanning amounted in 1936 to only $21,588, mainly imports by parcel post from Hong Kong; domestic trade accounted for $6·1 million. The tonnage entering and leaving the port was 67,998 tons, all in domestic trade. Cotton yarn and piece-goods, cement, tobacco, and matches formed the bulk of the imports; wood oil and aniseed oil were the chief exports. Until the Japanese occupation of the Canton delta the trade of Nanning suffered little; thereafter it was directed mainly towards French Indo-China and practically ceased with the Japanese seizure of Nanning itself from November 1939 to October 1940, and occupation of French Indo-China in 1941.

Communications

Nanning, as the capital of Kwangsi, was the centre of the highway system constructed by the provincial government from 1930 to 1939. A gravel surface motor road of fair quality runs north via Pinyang and Liuchow to Kweilin, a distance of 416 miles; a road of similar type runs to Lungchow via Siulok, a distance of 122 miles. These two together constitute the Nanning highway. Another good motor road runs north-west into Kweichow, via Kuote and Pingma. Motor roads also run to Wuchow via Watlam, and to Yamchow. Motor-bus services operate on several of these roads, and in the city and suburbs.

Part of a railway to run through Nanning, from Chennankwan on the French Indo-China frontier to Hengyang in Hunan, was completed in 1939. The Japanese occupation of Nanning in late 1939 put an end to further work on the Liuchow-Chennankwan section of the line. In the autumn of 1944 the Japanese began a new drive on Nanning with the object of completing the railway from the French Indo-China frontier to Liuchow and thus obtaining control of a railway route from Peiping to Singapore.

Water routes still remain important and regular services run upstream to Lungchow on the Tso kiang and to Poseh on the Yu kiang and downstream to Wuchow. Up to 1938 the South-western Aviation Corporation aircraft used to call at Nanning on the Canton-Hanoi service. There is a local dial telephone service, while land lines run to all important centres in the province. In 1935 the Ministry of Communications operated a commercial W/T station, while the Kwangsi provincial government owned a medium-wave broadcasting station.

Wuchow

Lat. 23° 29′ N., long. 111° 20′ E.	Population (1938), 82,349
Admiralty chart 2735	Fig. 44. Plate 60

Wuchow is situated at the confluence of the Kwei kiang with the Si kiang about 180 miles upstream from Canton. It serves as the distributing centre for trade between Kwangsi, Kweichow and eastern Yunnan, and the ports of the Canton delta.

Approach and Access

Wuchow is at the limit of navigation for ocean-going vessels and is accessible to vessels drawing 13 ft. in the high-water season;

in the low-water season the draught limit is 7 ft. The water levels at Wuchow are very irregular (Fig. 92); a minimum of 2 ft. 10 in. below and a maximum of 68 ft. above the zero datum have been recorded since 1897. The average difference between winter minimum and summer maximum is about 45 ft., and the annual summer floods which may occur with little warning frequently bring about a complete cessation of traffic. Typhoons also may occur during the summer months. In high flood the river may run at rates of 5 to 8 knots, but in winter the rate does not exceed 1½ knots. The Kwei kiang, which is also subject to rapid changes of level, is navigable in the high-water season as far as Pinglo for vessels drawing 3 ft. 8 in., but junks travel as far as Kweilin.

Detailed Description

To obviate the inconvenience caused by the changes in the level of river, steamship offices, customs and tax offices are located on *p'ai* (houses built on pontoons) moored alongside the river bank. There are nine shipping company *p'ai*, three tax bureau *p'ai*, and one customs *p'ai* on the north side of the river, where the bank slopes considerably. There are numerous *p'ai* also moored along the Wuchow side of the Kwei kiang. The usual anchorage is abreast the Commissioner's house, east of the city, in 23 to 39 ft.; there is a junk anchorage off the city at the confluence.

Port Facilities

There are usually no stocks of coal available, as vessels bunker down river; the Asiatic Petroleum Co. and the Standard-Vacuum Oil Co. keep stocks of fuel oil for motor boats at their installations on the south bank of the river, with landing steps to the waterfront. Water for drinking may be obtained from the local waterworks and for boilers from the river. Supplies of fresh provisions are generally plentiful. Harbour craft include launches, native craft, and a Diesel-engined fire-float, owned by the Chamber of Commerce. There are three small floating docks capable of handling launches and motor boats not exceeding 100 ft. in length.

The Town

Wuchow is a walled city built on the rising ground on the north bank of the river. Much of the enclosed area is not built upon, but there are extensive suburbs outside the walls along the river bank to the south and south-west, where the commercial quarter of the

town lies. The few foreign residents, who are mainly connected with the missions, live to the south-east of the city, along the river bank and on the western bank of the Kwei kiang. Wuchow was opened as a treaty port in 1897 by the Burma Agreement between Great Britain and China. Public utilities include a modern fire-brigade, a Diesel-operated electric light plant, and a new water-works operated by the provincial government. There are two large mission hospitals and five other hospitals. Wuchow is also the site of the provincial University of Kwangsi.

Industries

Wuchow is a city of commercial rather than of industrial importance; there is, however, an important boat-building industry, some textile factories, and a factory for the manufacture of flashlight torches.

Trade

In 1936 the total tonnage entering and leaving Wuchow was 986,766, of which only 12 per cent. was in domestic trade. The total value of the foreign trade was \$20·9 million, and of the domestic trade was \$22·3 million. Important exports include ores from Kwangsi and Kweichow (manganese, tungsten, tin, and antimony), vegetable oils, mainly wood-oil, aniseed oil, and tea oil; livestock, chiefly pigs and poultry; cassia and timber. The more important imports are mineral oils, metal goods, cereals, mainly rice, and sundry manufactured articles. Imports are mainly from Germany, U.S.A., and Great Britain, while the export trade was entirely with Hong Kong. After the opening of Sino-Japanese hostilities in 1937, the trade of Wuchow showed some improvement, but with the occupation of Canton and the lower Si kiang area in 1938, Wuchow practically ceased to function as far as foreign trade was concerned.

Communications

There are no roads leading directly to Wuchow, but from Yunghui, about 9 miles upstream on the south bank of the Si kiang, a well-surfaced motor road runs to Watlam, a distance of 134 miles. From Watlam, roads run to Nanning, Lungchow, Luichow, Kweilin, and other important centres of Kwangsi province, and thence into the neighbouring province of Kweichow. A launch service runs from Wuchow to Yunghui to link up with the road.

Water communications are of great importance, and by means of

the Si kiang and its tributaries, regular services run upstream and downstream to all the important river ports. From 1934 to 1938 the South-western Aviation Corporation operated a service from Canton to Hanoi, calling at Wuchow regularly. The airfield used, on the south side of the river, was not entirely satisfactory since it was liable to inundation in the high-water season. The telegraph office at Wuchow is linked up with the Chinese telegraph system by land lines to Canton, Kweilin, and Kweihsien; there is a W/T station under military control which receives but does not transmit commercial messages.

SAMSHUI

Lat. 23° 11′ N., long. 112° 50′ E.	Population, *c.* 9,200
Admiralty chart 2734	Fig. 45.

Samshui is situated near the junction of the Pei kiang and the Si kiang, about 25 miles west of Canton. It serves as a port of call and distributing centre on the water route from the Canton delta ports to the interior of eastern Kwangtung and of Kwangsi.

Approach and Access

Samshui is approached westward from the Si kiang through Samshui junction and eastward through the Fatshan branch from the Chu kiang. The network of channels through the delta leading to Samshui has numerous bars and sandbanks whose positions and depths are continuously changing. At the high summer level vessels of 10 ft. can reach the port, but during winter the draught-limit is 4 ft. A bar off the south-eastern side of Laoya chow (Rattler island) has depths of 2–4 ft. at low water, while the Fatshan branch allows small craft only of 2 ft. draught in the low-water season. Freshets from the Si kiang and the Pei kiang often accompanied by violent squalls may cause severe floods in June and July, when depths of over 30 ft. have been recorded on the bar. The maximum summer water level is about 18 ft. above the winter minimum (Fig. 92). The approximate rise of spring tides at Samshui is 5–6 ft.

Detailed Description

The anchorages at the port are off Hokau (Inner anchorage) in 12–18 ft., and outside the bar off Kongkun (Outer anchorage) in similar depths. In winter the Inner anchorage is closed to vessels drawing over 5 ft. Both anchorages are subject to squalls and freshets in summer, during which typhoons may also occur. Navi-

gation is also impeded by numerous native craft and large timber rafts coming down the Pei kiang.

Vessels of up to 200 ft. can anchor with safety in the port ; there are no wharfs or pontoons, and vessels lie to their own anchor, discharging and loading into small craft. Work on the erection of a reinforced concrete jetty 735 ft. long was commenced in March 1937.

Port Facilities

Water is supplied from the river and from wells, and fresh provisions are available for small craft only. There are no facilities for obtaining coal, but firewood is plentiful ; small quantities of crude oil may be obtained from the Asiatic Petroleum Company's oil depôt near Hokau, which has a small jetty with a pipe line.

The Town

Samshui itself is built on rising ground three-quarters of a mile north of the river. Its imposing walls, dating from the Ming period, were demolished in 1930. The business centre is at Hokau, on the river front, and at Sainam, a busy modern industrial centre of about 40,000 inhabitants, three miles to the east on the north side of the Fatshan branch. Samshui and Kongkun together constituted the treaty port, which was opened in 1897 according to the provisions of the Burma Agreement between Great Britain and China.

Industries

There are no industries at Samshui, but at Sainam there are silk filatures, cotton mills, flour mills, and an electric-light plant which also supplies Samshui. At Hokau there are Chinese boat-building yards.

Trade

Since its opening in 1897 the trade of Samshui increased steadily but it received a considerable setback from the anti-British boycott of 1925. Junk traffic has been particularly large since the abolition of *likin* in 1931. In 1936 the total tonnage entering and clearing at the port was 1,811,068, of which slightly over half was domestic trade. The value of the foreign trade was \$1·2 million in 1936, and of the domestic trade only \$39,064. The chief exports were timber, cassia, and tea ; the chief imports being metal goods, salt fish, and cereals. The export trade is mainly with Hong Kong, while French Indo-China, Hong Kong, and Japan played the major part in the

import trade. Since the Japanese occupation of the Canton delta in 1938 no further statistics of foreign trade in respect of Samshui have been issued.

Communications

A standard-gauge railway runs from Canton to Samshui, a distance of about 30 miles: this line is double-tracked from Fatshan to Canton. Earth motor roads run to Fatshan to join the Canton–Yeungkong highway and to Tsingyun, via Szewui, but the railway and the river carry most of the traffic. There are frequent steamer services up the Si kiang to Wuchow, and through the water routes of the Canton delta to Canton, Macao, and Hong Kong. The telegraph office is at Sainam, from which lines run to Fatshan, Szewui, Shiuhing and places beyond.

Kongmoon

Lat. 22° 35′ N., long. 113° 09′ E.	Population, *c.* 55,000
Admiralty chart 3588	Fig. 46. Plate 59

Kongmoon is situated on Kongmoon creek, which links the main Si kiang channel with the Tam kong. The harbour is at Pakkai, 3½ miles to the north-east on the west bank of the Si kiang, immediately above its confluence with Kongmoon creek.

Approach and Access

From the south-west an approach with least depth 7 ft. is available, through the Tam kong, Futiu mun, Holmes creek, and thence into the main river. From the Chu kiang the usual approach is by way of Wang mun, Kerr and Junction channels and Mahning reach into the Si kiang, north of Kongmoon; the draught of ships crossing Wang mun and Mahning bars should not exceed 11 ft. Vessels up to 8 ft. draught can proceed through the Broadway and the channel south of Chaulin island, where a depth of 24 ft. was recorded in the fairway in 1932.

Tidal streams off Pakkai attain 4–5 knots in the summer high-water season and 1 to 2 knots in the winter low-water season. Mean high-water springs are about 6 ft., but owing to the large diurnal tide this figure may be considerably in error; the rise tends to be less in the low-water season. Pakkai is naturally well sheltered, but may be visited by typhoons in the summer.

Detailed Description

At Pakkai there are the following four wharves:

Wharf	Frontage	Depth at L.W.O.S.T.
	ft.	ft.
Railway	400	10
Shu On	80	10
Tonghau Shu Tong	49	10
Lee On	36	6

Shu On wharf is rarely used, Lee On wharf is used by Macao steamers, and the remaining two by Hong Kong steamers. All are in a bad state of repair and without godowns, though the railway wharf is partially roofed. At Kongmoon itself there is a stone bund about one mile in length, used by junks and tow boats of 4–5 ft. draught at any state of the river.

Port Facilities

Water supplies for all purposes may be had from the river, but a municipal waterworks was projected in 1937; small stocks of fresh provisions are available.

There are no coal-bunkering facilities, but fuel oil is stocked by the petroleum companies as follows:

	Tankage	Godown accommodation
Asiatic Petroleum Co.	900 tons	250,000 gallons
Standard-Vacuum Oil Co.	400 „	500,000 „
Texas Co.	nil	500,000 „

The Asiatic Petroleum Co. has a motor junk of ten tons' capacity for supplying oil fuel to motor craft.

The Town

Kongmoon was opened as a treaty port in 1904, in accordance with the provisions of the Mackay Treaty (1902), to serve the western districts of the rich Canton delta. Owing to the opening up of other treaty ports and the development of Canton and Hong Kong

it never realized these hopes. As a commercial centre it suffered severely in the economic depression of the 'thirties when remittances from Chinese overseas fell off considerably. It serves now as a junk and river steamer port with traffic almost entirely with Hong Kong, Macao, Canton, and adjacent areas. The town extends along the west bank of Kongmoon creek, with offices and commercial buildings along the waterfront. Electricity is supplied by the plant of the Kongmoon City Electric Light Co.; the Customs house has its own small plant. There are two mission hospitals. To the east of the town on the south bank of Kongmoon creek is a paper mill, but its output is of poor quality; there are also cotton mills, rice mills, and silk filatures.

Trade

In 1936 the total tonnage entered and cleared at Kongmoon was 1,211,927, all of which was stated to be in foreign trade. The total value of the trade at the port was $8·5 million, of which about 20 per cent. was in domestic trade.

The principal articles of export were fresh fruit and vegetables, silk, garlic, palm-leaf fans, and softwood poles; the more important imports were cotton and rayon piece-goods, salt fish, and fertilisers. Hong Kong dominates the export trade of Kongmoon; imports come mainly from French Indo-China, Japan, and U.S.A. With the extension of the Sino-Japanese hostilities to the south coast of China in 1938 the trade of Kongmoon suffered a serious setback, and in 1939 it was less than one-quarter of the normal.

Communications

A standard-gauge railway operated by the Sunning Railway Co. runs from Pakkai, 73 miles south to Towshan, a village on a tidal creek six miles from the sea, accessible to small junks and launches. A branch line runs 20 miles west from Toishan to Paksha.

A number of earth motor roads recently constructed are generally in good condition. The most important is the main road from Pakkai to Shuitung, 294 miles to the south-west, via Yeungkong. Another important road with several ferries en route, runs north for 40 miles to Fatshan to link up with the Samshui–Canton railway. A road also runs to Hokshan, 39 miles away, to join the Canton–Yeungkong highway. There is an intricate network of rivers and creeks, many unnavigable in the low-water season; there are frequent steamer services to Canton, Macao, and Hong Kong. Telegraph lines run

to Canton, Yeungkong, and Shekki, and thence to any part of the country; there is also a commercial W/T station operated by the Ministry of Communications.

LAPPA

(See also vol. ii, Appendix iv, Macao)
Admiralty charts 1180, 2562, 3681

Lappa is a large hilly island which shelters the inner harbour of Macao from the west. The island, which the Chinese call Tulien shan, is of no particular importance, but has given its name to a chain of Chinese Maritime Customs stations around Macao, of which the most important are on the island of Malau chau and at Chienshan on Macao island. The functions of the Lappa Customs stations, which were opened in 1871, are to deal with trade and shipping entering and leaving China by Macao, and there is no port in the area, with the exception of Chungshan, referred to locally as Tongka.

Chungshan port is situated in a shallow horseshoe-shaped bay, south of Bluff head, on the eastern shore of Macao island, about 10 miles north of Macao. The Chinese had a scheme of developing a port there to handle trade normally passing through Macao.

Approach and Access

There is a deep channel to the north between Bluff head and Keiou island, but the nearer approaches to Chungshan are very shallow and would need extensive dredging before ocean-going vessels could use the port. At present vessels drawing no more than 8 ft. can anchor inshore at high tide; at low tide such vessels would have to anchor about 1½ miles offshore. The rise of tide at mean high-water springs is about 6 ft., and at mean high-water neaps is about 5 ft. The port is well sheltered, but is occasionally visited by typhoons; a typhoon in September 1937 did great damage at Macao and the local anchorages.

Detailed Description

There is a stone jetty leading out into the bay from the centre of the beach which is firm and sandy. This jetty is 266 ft. long with a cross piece of 52 ft. in length; the depth of water at high water of spring tide is 8 ft., and at low water practically nil. There are no other facilities for landing or loading of cargo, and no stocks of fuel, water, or provisions for vessels using the port.

The Town

The only settlement nearby is the small town of Tongka, on the north-west corner of the bay. It is well laid out with a concrete road, barracks and recreation grounds, street lighting system of oil lamps, and small water supply. Its main industries are fishing, for which the Macao and Lappa areas are particularly well known, and oyster farming. The oyster bed of Tongka, which is the property of the local municipality, is an important source of income.

Trade

In 1936 vessels of a total tonnage of 1,769,589 entered and cleared at the various Customs stations of the Lappa district, of which about one million tons was in domestic trade. The total value of the trade of the port in 1936, which was a relatively bad year, was \$7·1 million, of which but a small fraction was domestic trade. The principal imports were salt fish, kerosine and other mineral oils, fertilizers, rice, coal, and various manufactured goods; exports included live-stock and poultry, fruit and vegetables. Imports originated mainly in French Indo-China, Macao, Siam, and Great Britain, while exports went to Macao and Hong Kong only.

Hostilities in the Canton delta and the Japanese blockade of south coast ports produced abnormal trade conditions in the Lappa district after 1937. Foreign trade showed a large increase in 1939, totalling \$46·7 million, but by 1941 none was recorded.

There are no steamers or trading junks calling at Chungshan port, and the only trade from there is the export of fish and oysters to Macao, Canton, and Hong Kong.

Communications

There is only one motor road, leading to the village of Hachak on the main road from Macao to Shekki, the largest town in the district, but further road building in the area was projected in 1937. There is a telegraph and long-distance telephone office at Tongka.

Kowloon

(See also vol. ii, Appendix v, Hong Kong)

The Kowloon district of the China Maritime Customs covers the area contiguous to Hong Kong and the New Territories, and includes a chain of Customs stations at various points from Lintin island in

the Chu kiang to Samun on Tuniang island in Mirs bay. The Kowloon Customs stations were established in 1897, under the Chefoo Agreement of 1876 and its Additional Article of 1885 to record the movement of opium and to collect duty on trade between Hong Kong and Chinese ports. In 1899, after the New Territories were leased to Great Britain, the stations were moved from their former locations to their present positions. Kowloon is thus not a port in the normal sense of the word and owes its importance to its proximity to the great entrepôt of Hong Kong.

Trade

In 1936 a total tonnage of 1,769,589, all in foreign trade, entered and cleared at the Kowloon Customs stations. The total value of the trade of the district was \$63·8 million, all foreign trade, of which over 90 per cent. was imports.

The leading imports were rice, kerosine, gasoline, lubricating oils, vehicles and machinery of many kinds; exports include mineral ores of various kinds, especially tungsten and antimony ores, wood-oil, tea, and duck feathers. Imports originated in nearly sixty countries, of which the most important were U.S.A., French Indo-China, Great Britain, Netherlands East Indies, and Germany; the vast bulk of the exports were recorded as going to Hong Kong, for distribution to all parts of the world.

With the Japanese occupation of all the important ports of South China, greatly increased trade with Hong Kong was recorded by Kowloon district. With the exception of 1939 all years showed a substantial increase, as the following figures indicate:

Foreign Trade, Kowloon district, 1937–41
(*millions of dollars*)

1937	99·3
1938	174·5
1939	15·0
1940	118·4
1941 (January–September)	96·4

CANTON

Lat. 23° 07′ N., long. 113° 14′ E.
Admiralty charts 3620, 3646

Population (1935), 1,145,285
Figs. 48, 49. Plates 48, 61-4

Canton is situated on the left bank of the Chu kiang (Pearl river) about 83 miles by water from Hong Kong. Canton, at the head of the great delta formed by the Si kiang, Pei kiang, Tung kiang, and

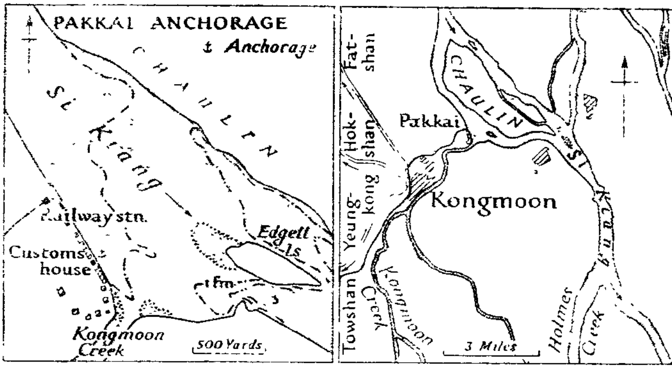


Fig. 46. Kongmoon, Pakkai anchorage and approaches

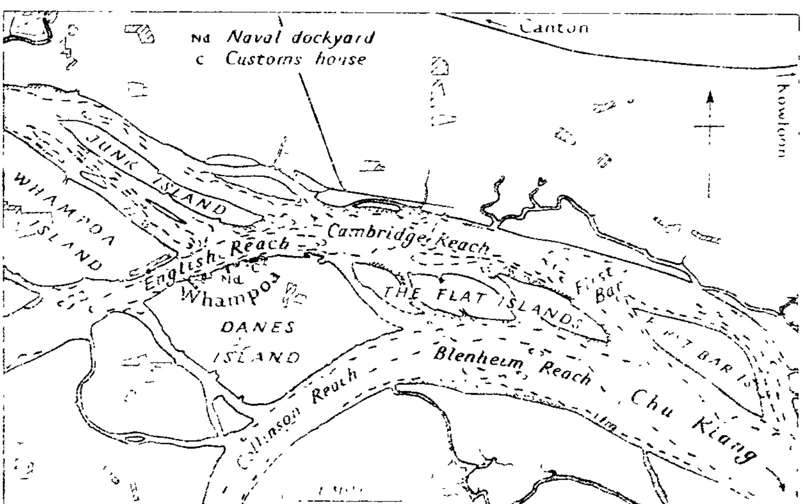


Fig. 47. Whampoa

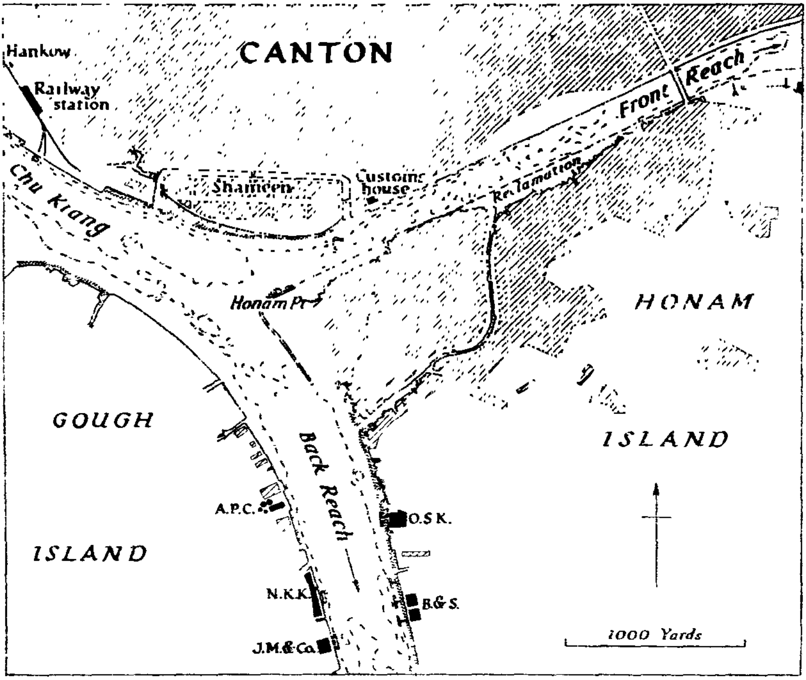


Fig. 48. Canton harbour

A.P.C., Asiatic Petroleum Co.; B. & S., Butterfield and Swire; J.M. & Co., Jardine, Matheson and Co.; N.K.K., Nissin Kisen Kaisha; O.S.K., Osaka Shosen Kaisha.

several lesser streams, gathers to itself the greater part of the trade of Kwangtung and Kwangsi, and has from early times been the major collecting and distributing centre of South China.

Approach and Access

Vessels approaching Canton and Whampoa from the sea generally use Lantao channel, the deepest of the channels leading to the Chu kiang estuary (see vol. i, p. 146). From the estuary various channels give access to the deltaic waters, while Chuenpi channel leads into the Chu kiang itself. A group of small islands at the entrance divides the river into two channels, Bremer channel, used by junks, and Boca Tigris, used by larger sea-going vessels. A deep channel with depths of more than 5 fm. runs about 11 miles upstream from Boca Tigris to Second bar, 20 miles below Canton, which should not be crossed without local knowledge. There is a least depth of 13 ft. over Second bar, but vessels of 22 ft. draught can cross it at high-water springs. A deeper stretch of water thence leads to Belcher reach, where the river is divided by the Flat islands and Danes island into two branches, Whampoa channel and Blenheim passage, which meet again at Honam point abreast of Canton city.

Vessels proceeding to Whampoa use the channel between the Flat islands and First bar island; off the north-western point of First bar island is First bar with a least depth of 18 ft. From there Cambridge reach leads past Cambridge barrier, a group of shoals, to Whampoa anchorage off Danes island. The upper part of Whampoa channel, leading to Front reach, opposite Canton, is used only by small vessels with draughts of less than 10 ft. There is considerable shoaling in some areas, and Whampoa barrier, which consists of wooden piles and sunken junks, is a prominent obstruction.

Blenheim passage, with a least depth of 9 ft. vessels, leads by a circuitous route to Back reach and Canton harbour. Collinson and Taishek barriers, remains of artificial obstructions, constructed of wooden piles, make navigation difficult in this passage.

The greatest draught which can reach Canton is 16½ ft. at high-water springs and 14½ ft. at high-water neaps. Steamers drawing 19 ft. have ascended to Canton, but 12 ft. is usual; vessels drawing 21 ft. use the anchorage 6 miles below Canton near Hamilton creek, above which Blenheim passage is not normally accessible to draughts of more than 16½ ft. The draughts for ships proceeding to Whampoa, 8 miles below Canton, are similar to those for crossing Second bar. The wind has a great effect on depths, which are greatest with south-

easterly winds and least with a north-westerly wind. The spring range of tides at Whampoa is $8\frac{1}{2}$ ft. and the neap range $7\frac{1}{4}$ ft., for Canton the figures are $5\frac{1}{2}$ ft. and $4\frac{1}{4}$ ft. respectively. The tidal current in Back reach normally runs at about $1\frac{1}{2}$ knots, but many attain 4 knots at ebb tides. Both Canton and Whampoa are naturally well sheltered, but the district is occasionally visited during summer by destructive typhoons.

Conservancy

In 1914 the Chinese government asked H. von Heidenstam, engineer-in-chief to the Whangpoo Conservancy Board, to advise on flood control, dredging, and other conservancy matters. As a result a Board of Conservancy Works of Kwangtung was formed under G. W. Olivecrona, under whose direction much training work in the delta area was undertaken. In 1915 von Heidenstam reported on the improvement of the approaches to Canton and Whampoa, and in 1917 Olivecrona put forward a project of dredging the Whampoa–Canton channel to a depth of 16 ft., which was never carried out. After the Kuomintang came into power in 1927, considerable interest was shown in the idea, especially since Dr Sun Yat-sen had sketched a very ambitious scheme of development to make Canton the 'Great Southern Port' of China in his book *The International Development of China.* Various projects were mooted, with particular emphasis on the use of Whampoa for large vessels with a 24 ft. channel to the sea. This scheme involved extensive and costly dredging of First and Second bars, the criteria of admissible draught for the ports, but a beginning was made in 1937 with the building of a modern wharf at Whampoa, and the dredging of a channel over First bar 27·9 ft. deep and over Second bar 26·9 ft. deep.

The outbreak of war suspended all further work on the Whampoa harbour development scheme, but the First bar channel was about 90 per cent. completed and the Second bar channel about 40 per cent. completed. The building of spur dykes to increase stream scour and further dredging of bars and barriers were planned but not put in hand. These conservancy projects were undertaken by the Pearl River Conservancy Bureau, which is directly subordinate to the National Economic Council. In view of the high cost of improvement and maintenance, offsetting the advantage of taking shipping as far inland as possible, the future of these ambitious schemes is doubtful.

Detailed Description

Canton and Whampoa harbours are simple river channels with little accommodation for berthing except at buoys or pontoons. There are no lifting appliances, and all cargo is handled by manual labour, which is cheap and plentiful, and by ships' cranes. Port matters are in the hands of the Maritime Customs, which carries out its task efficiently despite occasional interference from the municipal authorities, who lack technical experience.

Whampoa.—The anchorages in English reach and American reach are safe, in depths of $4\frac{1}{2}$ to 7 fm. There are ten running mooring berths, but two vessels cannot anchor abreast. Apart from some small jetties on Danes island, and a wooden pier 150 ft. long on Powder island, there was no accommodation for ships berthing until the Netherlands Harbour Works completed in 1938 a new wharf on the north bank of the Chu kiang, 1,300 ft. long with a depth of 30 ft. at low water, together with reclamation of the neighbouring area. The new wharf with its attendant railway facilities should add materially to the usefulness of Whampoa, but the Japanese occupation of the area in the autumn of 1938 leaves the question in abeyance. The Japanese themselves have been improving the harbour facilities for naval use.

Canton.—At Canton there are 24 buoy mooring berths for regular traders and river boats, 12 buoys for mooring launches and tenders, and 15 single-buoy moorings for small private launches and house-boats: the majority of these are owned by shipping companies and foreign naval authorities. Foreign vessels can anchor anywhere in the harbour limits, but, as in most Chinese ports, there are special mineral oil, explosives, and quarantine anchorages. Off Shameen there is a spacious anchorage in 18 to 22 ft. with good holding ground. Vessels are directed to their berths by the Berthing officer of the port, who is attached to the Maritime Customs. The usual length of vessels permitted to enter the port is up to 350 ft. but vessels of up to 375 ft. are allowed to do so under special circumstances. There are numerous wharves available for shipping in Canton harbour. The bunded frontage on either side of Honam point, about 1,700 ft. altogether in length, can be used for berthing vessels up to 14 ft. draught at all stages of the tide. The following are the principal wharves:

Wharf	Length of frontage	Depth at L.W.O.S.T.	Area of godown space
	ft.	ft.	sq. ft.
Butterfield and Swire (3 wharves)	1,640	7–11	170,000
China Merchants' S.N. Co. ..	460	8½–12½	72,964
Hong Kong, Canton, and Macao S.B. Co. (2 wharves)	280	6½–12½	..
Jardine, Matheson and Co. ..	869	6½–9½	161,500
Nissin Kisen Kaisha	866	8½–10	35,525
Standard-Vacuum Oil Co. (S.O.C.O.N.Y.)	1,232	3–6	67,590
Asiatic Petroleum Co. (A.P.C.)			
Upper wharf	526	8–13	13,408
Lower wharf	320	¾–4½	25,000
Osaka Shosen Kaisha	433	9–10½	63,370
Luen Hing	100	7½–8½	..
Hop Shing	100	8–10	..
Kanam Tong	100	6–8½	..
Luen Yick	100	6–8½	..
Kwong Hing Co.	375	2½–9	27,691
Canton–Hankow railway (Wongsha)	60	11½	..

Port Facilities

Coal bunkering is not usually undertaken at Canton as most, if not all, ocean and coasting vessels do so at Hong Kong. Local yards stock small quantities for the use of inland water vessels and launches: bunkering is carried out by hand from lighters. For supplies of fuel oil also many vessels call at Hong Kong. The Asiatic Petroleum Co. and Standard-Vacuum Oil Co. have installations on the west side of Back reach; particulars are as follows (quantities in tons):

	Fuel oil	Solar oil	Kerosine	Gasoline
A.P.C.				
Tank capacity	4,020	37	5,750	100
Average stock	2,500	20	3,000	55
S.O.C.O.N.Y.				
Tank capacity	1,400	..	23,600	..
Average stock	100	..	400	..

The A.P.C. has a lighter of 115 tons' capacity, a 10-ton tank boat, and 7 lighters for packed cargoes; S.O.C.O.N.Y. has

one lighter of 100 tons' capacity for bulk oil and 7 lighters for packed oil.

Practically all vessels obtain stores at Hong Kong, where supplies are both adequate and cheap. Fresh provisions and ships' stores for small craft can be obtained at Canton. As vessels stay in the port only for short periods there is no regular system for supplying water: drinking water, except for local craft, is usually taken in at Hong Kong and boiler water invariably from the river.

At Whampoa, on the north shore of Danes island, there is a naval dockyard. The workshops are largely in disrepair, and a 60-ton derrick on the wharf is reported able to lift 15 tons only. There are two dry docks, Locksun dock and Cooper's dock, 450 ft. and 480 ft. long respectively, unusable owing to silting and lack of pumping machinery. At Canton there are two docks near Macao fort at the southern limit of the harbour. Details are as follows (measurements in ft.):

	Length	Breadth of entrance	Depth over sill
No. 1 dock	330	40	15
No. 2 dock	212	36	12

There is a stationary sheer-legs capable of lifting 20 tons and workshops capable of building steam-engines of up to 2,000 h.p., and of undertaking general repairs to hulls and engines. In addition to a slipway 80 ft. long at this dockyard, which is controlled by the local government, there are numerous slipways throughout the harbour for launches of up to 100 ft., and a small floating dock capable of taking a launch or tender of up to 100 ft. General repairs can be undertaken at many of the workshops attached to these slips.

There is no regular salvage plant at Canton, but small craft can be salvaged by cargo-boats fitted with the necessary equipment and by the aid of native divers. There are no tugs at the port, but numerous launches are available for towing. Other craft at the port include lighters, tenders, and the municipal government's modern fire-float *Chinghua*. The Customs' launch, *Yuethoi*, and several small motor boats are also fitted with fire-fighting apparatus adequate to deal with fires amongst small craft.

The Town

Canton was formerly surrounded by a stone and brick wall, which has now been demolished to make way for a modern motor road. The area within the walls, which was about 2 miles wide, was subdivided into the Old City and the New City. The walls of the Old City were completed in the eleventh century and the smaller New City area on the south side was enclosed during the sixteenth century in the Ming period. These walls were surrounded by a ditch and pierced by fifteen gates. With the development of Canton as a

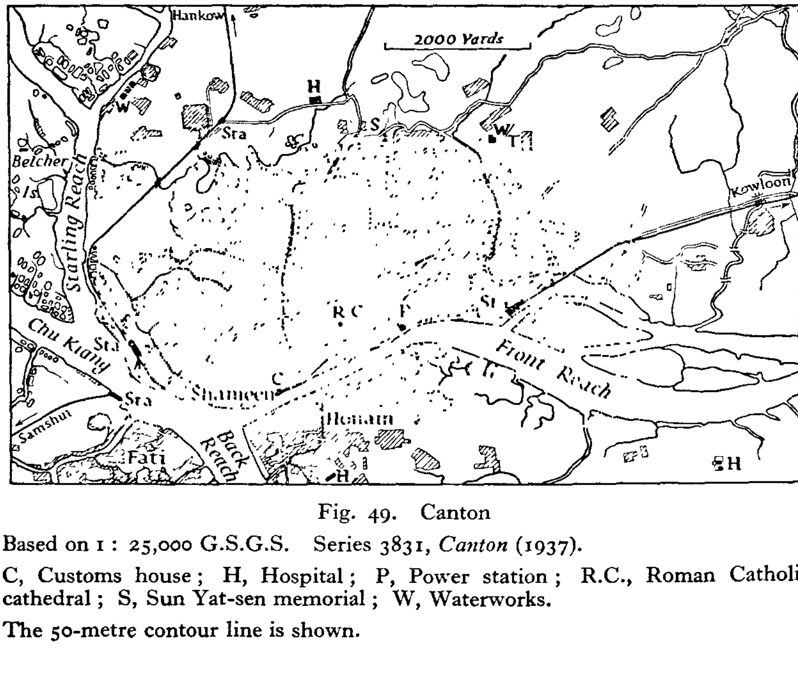


Fig. 49. Canton

Based on 1 : 25,000 G.S.G.S. Series 3831, *Canton* (1937).

C, Customs house; H, Hospital; P, Power station; R.C., Roman Catholic cathedral; S, Sun Yat-sen memorial; W, Waterworks.

The 50-metre contour line is shown.

trading centre, more modern suburbs grew up east (Tungkwan), south (Namkwan), and west (Saikwan) of the walled city, and at Fati and Honam across the river. The city now covers a distance of 5 miles along the waterfront. Old Canton is typically Chinese with narrow stone-flagged alleys, lined with busy shops, but there has been considerable modernization since 1927, with the construction of wide streets and modern administrative and commercial buildings. A large stretch of the waterfront is in the process of being reclaimed and bunded, and a bridge was completed in 1933 linking the main city across the Chu kiang to Honam. Bridges from Wongsha to

Belcher island and thence to Shekwaitong were under construction in 1936, but were never completed.

There are many temples and pagodas in the city and its suburbs, of which the most famous is the five-storied pagoda on Kanyin hill, at the foot of which the Sun Yat-sen Memorial Hall is situated. Kanyin hill also contains one of the city's four parks.

Canton has also some importance as a centre of learning. As well as modern schools of various types, there are eight establishments of university standing, of which Sun Yat-sen University and Lignan University on Honam island are the best known.

Electric light is supplied by the municipally-controlled Kwangtung Electric Co., which has two large power stations, one on the bund west of Honam bridge, and the other at Saitsun, north-west of the city. The Canton–Hankow railway and Shameen have their own small electric plants. The city waterworks are situated at Tsingpu to the north-west of the city, but Shameen has its own supply. There is no modern sanitation system in Canton, but there are thirty hospitals, some very large, of which seven, including one at Shameen, are under foreign administration.

Canton was created a municipality in 1921, and is administered by a mayor and bureaux controlling the various municipal activities, subject to the approval of the municipal government. The municipality maintains, in addition to its fire-float, several fire-brigades equipped with up-to-date equipment, and controls the city police force.

History

Kwangtung, which formed part of the domains of the aboriginal *Nan yueh* tribes, was conquered in the second century B.C. by the Han emperor Wu Ti (see vol. i, p. 318). By A.D. 300, Canton, then known as Kwangchow, which is the present official name, was the chief port handling trade between the South China sea area and the countries to the west. There was at that time a foreign quarter inhabited mainly by Arabs, Indians, and Persians. During the T'ang period the foreign trade of Canton was monopolized by Arabs, who retained this control for nearly eight centuries. In the thirteenth century the Mongols encouraged maritime as well as overland trade and appointed trade commissioners at other ports as well as Canton, which Marco Polo called 'Kangiu.'

The first Europeans to visit Canton were the Portuguese, who first arrived in 1516, and soon ousted the Arabs from their foreign

trade monopoly. The Portuguese, however, did not remain on the best of terms with the Chinese, and the appearance of the Dutch in 1620, and the English in 1647, brought powerful rivals on the scene. In 1684 the East India Company founded a factory at Canton, and soon had control of most of the foreign trade of China, and especially of the export of tea, which increased steadily. Under the Manchus Canton, as the seat of government of the vice-royalty of Kwangtung and Kwangsi, was second in importance only to Peking and Nanking. The importance of the city was further increased by the edict issued by the emperor Ch'ien Lung in 1757 restricting all foreign trade to Canton. The East India Company made strong efforts to extend its trade to other ports, but was always frustrated by the Co-Hong or trade guild of Canton, who valued the special privileges it possessed with regard to foreign trade. Though the company was dissolved in 1834, the Co-Hong continued to function and to impose restrictions which eventually led to the first Anglo-Chinese war (see vol. ii, p. 17). The provisions of the ensuing Treaty of Nanking permitting foreigners to reside at Canton were persistently resisted, and the ill-feeling thus engendered eventually led to the 'Arrow' war, when foreign factories and residences in Canton were pillaged and burnt by a Chinese mob. British and French forces occupied the city from 1857 to 1861 after the Treaty of Tientsin and the Convention of Peking. In 1859, when Canton was officially opened to foreign trade, the mud flat of Shameen in the Chu kiang, south-west of the city, was appropriated as a foreign concession; the land was reclaimed, embankments built and a canal constructed between Shameen and the city. The total area of the artificial island thus created was about 44 acres, of which the western four-fifths comprise the British Concession, relinquished in favour of China by the Treaty of 1943 (see vol. ii, p. 170), and the remainder the French Concession. The British Concession, administered by a council of five British members, had a population of about 1,800, while the French Concession, controlled by a council of two French and one other foreign member, had a population of about 600.

In the twentieth century Canton has been famous for its strongly nationalist outlook. As the home of Dr Sun Yat-sen it played a prominent part in the revolutionary movements of 1911–12, and of later years, and from here in 1926 the Kuomintang began its expedition to unify China under its standard. For the first year of the Sino-Japanese war Canton remained free of hostilities. In the

summer of 1938 the city was subjected to several destructive air-raids, and was eventually occupied by the Japanese in October 1938 after a swift advance from the Kwangtung coast.

Industries

Modern industrial development in Canton has been in light rather than in the heavy industries. An iron and steel works, however, was projected before the outbreak of the Sino-Japanese war, and there are numerous engineering and machine works and small ship-building yards. The government operates several armament works and heavy chemical factories. Other industrial establishments in Canton or the neighbourhood include cement factories, pottery and glass works, paper mills, rubber factories, an aerated water factory, match factories and dyeing works. There is a considerable output from small home industries engaged in the manufacture of matting, embroideries, and fancy goods of all kinds, and in the preparation of tea, ginger, and cassia.

Trade

In 1936, 14,855 vessels, with a total of 8,338,972 tons of shipping, entered and cleared at Canton (this figure does not include a large number of junks), foreign trade accounted for just over five and a half million tons. In tonnage of shipping in foreign trade, Canton ranked second to Shanghai with 12·28 per cent. of the total for China Proper.

The large part played by British shipping is illustrated by the following figures for vessels piloted during the year 1936 :

Nationality	Number
British	1,182
Chinese	567
Norwegian	227
French	27
Dutch	24
Japanese	18
American	10
Danish	6

The total value of the trade of the port was $218·0 million, made up as follows :

	Imports	Exports	Total
Domestic trade ..	106·2	38·4	144·6
Foreign trade ..	30·9	42·5	73·4

Canton ranked fourth in foreign trade to Shanghai, Tientsin, and Tsingtao; in domestic trade it ranked above Tsingtao, but was excelled by Hankow, Tientsin, and Shanghai. The figures for Canton, which of course include Whampoa, do not include a large amount of cargo from abroad, which is passed at Kowloon and recorded in the statistics for Kowloon. The volume of the trade of the port can be better realized by adding the figures for Kowloon, which would almost double the value of foreign trade and rank Canton above Tsingtao.

Exports covered a wide range and included raw silk, silk fabrics, matting, wolfram and antimony, wood-oil, cassia, ginger, hides, feathers, tea, tobacco, kittysols and other fancy goods, bamboo canes, furniture, paper, and porcelain. Among the imports were cotton yarn and piece-goods, mineral oils, mainly kerosine and gasoline, cereals, chiefly rice, machinery and vehicles, coal, scrap iron, beans and bean oil, fertilizers, ground-nuts, and sundry manufactured articles.

The effects of industrialization in Kwangtung from 1930 to 1938 has been shown by a steady decline in imports of manufactured goods of all kinds from abroad. The leading countries in the import trade were Germany, U.S.A., Great Britain, France, N.E.I., and the Japanese Empire. Half of the exports went to Hong Kong, but the great majority of these ultimately reached other countries; French Indo-China, British India, and U.S.A. together accounted for over a further 25 per cent. of the export trade.

In the early stages of the Sino-Japanese war Canton profited by the closing of the Yangtze route, and in 1938 the total value of trade exceeded $300 million, though the occupation of the city by the Japanese in October materially affected trade returns for the final quarter of the year. After a very bad year in 1939 some slight improvement was shown, but in 1940 foreign trade was still only half of the normal figure.

Communications

The Canton delta is a maze of canals, creeks, and waterways, which offer the most important means of communication in the district. In the low-water season many of these waterways are dry or are navigable only to small vessels of up to 2 ft. draught, but at high water many are available to vessels drawing up to 6 ft. Regular launch services run to many towns in the delta, and river steamers

Plate 61. The Chu kiang, Canton

A view upstream looking north-west. The clump of trees in the middle distance indicates the position of the former concessions of Shameen, the building with the flag is the Customs house, and next to it on the right is the General Post Office.

Plate 62. Waterfront and house-boats, Canton

The modern buildings lining the waterfront can be seen across the Chu kiang; in the foreground is a group of the house-boats, in which many of the city's inhabitants dwell.

Plate 63. Street scene, Canton
A modernized street in Canton with several *p'ai lou* (memorial gateways) still standing.

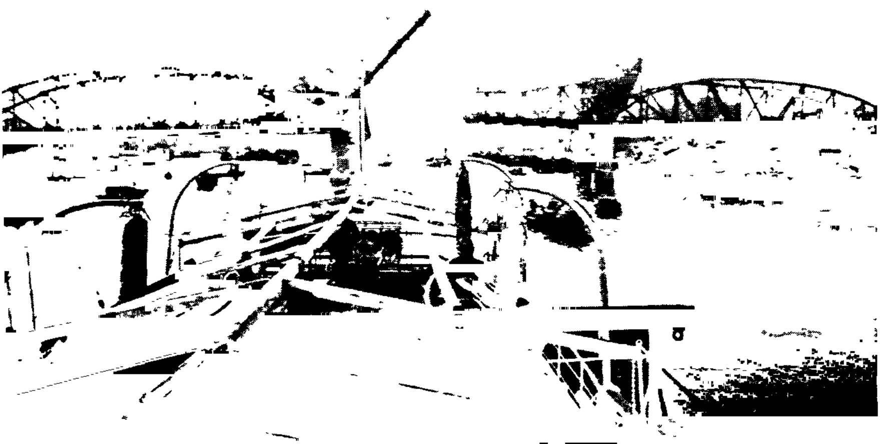


Plate 64. Honam bridge, Canton
The bridge linking Canton with Honam island was built in 1933.

operate to Hong Kong, Macao, and to the Si kiang ports of Kongmoon, Samshui, and Wuchow.

As well as an extensive road network in the city and suburbs, a series of new highways radiate from Canton to the most important towns in Kwangtung. The most important are those running to Kowloon, to Waichow, to Shuichow (part of the Hankow–Canton highway) to Yeungkong and to Samshui; large sections of these roads are, however, in poor condition.

Three standard-gauge railway lines operate from Canton, to Samshui, to Kowloon, and to Hankow. A loop-line to link up the Canton–Hankow and Canton–Kowloon railway with an extension to Whampoa was completed in 1937, and the Japanese since then have constructed branch lines from the Canton–Kowloon railway to Whampoa and Shekpai. The terminus of the Canton–Hankow railway is at Wongsha, west of the city on the north bank of the river; on the opposite bank at Shekwaitong is the terminus of the Canton–Samshui railway. The terminus of the Canton–Kowloon railway is to the east of the city at Taishatao.

In 1933 the C.N.A.C. began a seaplane service from Shanghai to Canton, which was extended in 1936 to Hong Kong to make connexion with Pan-American Airways and Imperial Airways services. The South-western Aviation Corporation, essentially a Kwangtung venture, operated four services from Canton, two by different routes to Hanoi, to link up with *Air France* services, one to Nanning and one to Kiungchow. The Japanese in 1940 were said to be operating a regular service from Canton to Taihoku (Formosa) connecting with services to Japan. The civil airfield is at Shekpai, 4 miles east of the city; seaplanes alight in the river at Taishatao.

Canton normally has telegraph connexion not only with all the important cities of China, but with Hong Kong, French Indo-China, Burma, and India; a long-distance telephone service with Hong Kong was maintained up to 1938. There is a local automatic telephone system of 4,600 telephones. The Ministry of Communications operated five W/T transmitters in Canton, which maintained communication with Shanghai, Tientsin, Amoy, Swatow, Macao, and Hong Kong. Butterfield and Swire owned a W/T station at Shameen which had regular communication with Hong Kong. In 1935 the municipal government operated a medium-wave broadcasting station.

SWATOW

Lat. 23° 21′ N., long. 116° 40′ E. Population (1935), 178,636
Admiralty chart 854 Fig. 50. Plates 65, 66

Swatow is situated at the mouth of the Han kiang in the southernmost corner of the Han delta, on the north shore of an arm of the sea stretching about 10 miles inland to the mouth of the Kityang kiang. Swatow, which is the chief shipping port and general entrepôt for eastern Kwangtung, lies about 170 miles north-east of Hong Kong and about 120 miles south-west of Amoy.

Approach and Access

Vessels approaching Swatow must cross a bar about 2 miles outside the entrance, a short distance north of Chihwen tao. The limits for safe navigation of the bar are as follows:

$$\text{High-water spring tides} \begin{cases} \text{north-east monsoon } 20\tfrac{1}{2} \text{ ft.} \\ \text{south-west monsoon } 19 \text{ ft.} \end{cases}$$

The depth at L.W.O.S.T. is 13 ft. In 1937 the depths on the bar were reported to be 2 ft. less; great care must be exercised when a swell is on.

Across the bar there is a choice of two entrances in the channel between the hilly mainland to the south and the low southern shore of the Han delta to the north. Luyu channel, south of the two islets Luyu (Sugarloaf island) and Muyu (Double island), is about 300 yards wide with depth of 6 to 11 fm. in the fairway; north of the islands is the less frequented Eastern channel with depths of 3½ to 8 fm. Between Muyu and the port are numerous rows of fishing stakes which may hinder navigation, especially at night.

Tides are very irregular and greatly influenced by prevailing winds, rises being considerably lower during the south-west monsoon; at springs the rise is 7½ ft. and at neaps 7 ft. The ingoing tidal stream attains a speed of 2 knots, the outgoing stream 4 knots.

The harbour is well sheltered but a heavy swell occurs at ebb tide when the wind blows strongly from the north-east. Typhoons may occur during the summer months; that of 2 August 1922 was particularly destructive and some 50,000 people lost their lives.

Detailed Description

The harbour area lies between the rocky promontory of Kakchio (Chuehshih) to the south and the flat land of the Han delta, on which the city stands to the north.

There are two lines of mooring buoys off Swatow, Nos. 1, 3, 5, 7, 9, 11, 13, 15 on the Swatow side, Nos. 4, 6, 8, 10 on the Kakchio side; all moorings are laid down in 36 to 42 ft. of water, except the customs-owned buoys Nos. 13 and 15, which are in 31 to 32 ft. respectively at L.W.O.S.T. No. 1 buoy is suitable for vessels up to 400 ft. long, the others for vessels up to 350 ft. long; buoys Nos. 1 to 11 are owned by the shipping companies.

Five pontoons, with bridge connexions to the bund, and two piers are available for the berthing of steamers, with the following particulars:

	Frontage	Depth at L.W.O.S.T.	Godown storage area
Butterfield and Swire	ft.	ft.	sq. ft.
No. 1 pontoon	180	17	..
No. 2 "	180	13	230,000
No. 3 "	150	18	..
No. 4 "	170	15	..
Jardine Matheson and Co.			
pontoon..	210	19·6	144,000
Asiatic Petroleum Co.			
pier	48	18	20,000
Standard-Vacuum Oil Co.			
pier	80	34	48,000

An additional pontoon owned by the China Merchants' Steam Navigation Co. was sunk in the autumn of 1937; there is 6·5 ft. of water over the pontoon when the tide-gauge reads zero. There are pipe-line (8 in.) jetties from both the petroleum companies' wharves; that owned by the Asiatic Petroleum Co. can accommodate vessels up to 500 ft. long, draughts of up to 28 ft. at mean low-water springs. On the west side of the city there are three steam-launch jetties.

At Kakchio there are several landing places for small craft. Consulate pier, a stone and steel structure 450 ft. long, is

available for about 30 tugs and lighters at normal high water. Jardine and Bradley's pier, 300 ft. long, accommodates about 15 lighters.

A pier between these two, damaged by a typhoon, is now unusable. At Niutienchow (Gochang point) there is a ferry pier ; the Japanese are reported to have built a wood and stone wharf here, 1,640 ft. long, in 1940.

Port Facilities

There are no cranes or lifting appliances in the harbour : discharge and loading is carried on by wooden lighters of up to 40 tons' capacity, normally towed by steam and motor launches. Repair facilities are negligible, but there are two wooden salvage barges fitted with sheer legs for lifting buoys and moorings. There is no graving dock, but the Chinese boat-building yards are capable of slipping launches of up to 120 ft.

Apart from steam launches and other small craft, vessels rarely bunker at Swatow, but stocks of coal of up to 9,000 tons, mainly from Kaiping and Hongay, are kept at the port ; coal is loaded by basket from lighters. No fixed stocks of fuel oil are maintained, but up to 200 tons are generally available. The Asiatic Petroleum Co. has two tanks, each of 760 tons' capacity Solar Diesel oil, fuelling by gravity through an 8-in. pipe-line to the jetty. The company owns two oil lighters 11 and 16 tons' capacity respectively and two 'packed' stock lighters with a total capacity of 2,870 tons. The Standard-Vacuum Oil Co. has tanks for 5,500 tons fuel oil and 7,600 tons kerosine and a stock of 4,000 cases of kerosine ; fuelling facilities are similar to those of the Asiatic Petroleum Co.

Fresh water for both boilers and drinking is supplied to ships by water boats, of which there are four in the harbour, each with a capacity of about 35 tons. Ships' stores are obtainable and fresh provisions are plentiful. Harbour craft, in addition to oil lighters and water boats, include about 30 launches, 150 lighters, and numerous sampans.

The Town

Swatow is built on the alluvial and reclaimed land at the south of the Han kiang delta. Like Amoy and other ports of the south-east, it is being steadily modernized, and a complete new layout of streets is being planned to take the place of the narrow dirty alleyways and mean dwellings of the old Chinese city, north of the

commercial centre, which extends eastward along the waterfront. Reclamation is proceeding along the waterfront and a scheme for a new bund is in hand. Many modern ferro-concrete buildings have been erected in recent years and the Chung shan public park is constantly being improved; it is proposed to establish a new park, Sun Yat-sen park, on reclaimed ground south of Kialat road, which is the best residential centre.

For Swatow water is brought by pipe-line from a reservoir at Ampow, 8 miles inland, where there is a reservoir of 500,000 gallons' capacity and a pumping station; at Kakchio water may be had from wells and springs. There is a sewage system at Swatow, and the city is on the whole healthy; there are two large and four smaller hospitals. Electric light at 220 volts is supplied by the city power plant. There are three modern fire-brigades, two of which are financed by local charitable guilds.

History

As early as the eighteenth century the East India Company had a station on Namao island outside the harbour. Here the firm of Bradley and Company established themselves in 1855, but later moved to Muyu: at this time Swatow (or Shantou) was little more than a fishing village on a mud-flat. The port was opened to trade in 1860 by the Treaty of Tientsin (1858), and in 1862 a grant of land was made to Great Britain about a mile outside Swatow, but the projected settlement fell through owing to the hostility of the populace. Foreign residences and offices were established, however, at Kakchio, and before 1870 foreigners were freely living and trading in Swatow itself. Kakchio, an island with granite hills separated from the mainland to the west by Tathoupo (Tatapu) creek, is still the chief place of residence for foreigners.

Industries

Swatow is essentially an agricultural, fishing, and trading centre, and there has been little industrial development; even the embroidering of linen and making of lace is mainly a cottage industry. The largest modern industrial concern in the district is the Kityang Sugar Central; many small native factories exist for sugar refining, oil refining, flour-milling, and manufacture of soap, medicinal preparations, matches, flashlight batteries, cotton thread, and canned goods.

Trade

In 1936 a tonnage of 6,629,842 entered and cleared at Swatow, of which about 40 per cent. was in domestic trade; this figure does not include junks, of which about 15,000 enter and clear annually. The total trade of the port in 1936 amounted to $146·1 million, of which about two-thirds was domestic trade. Of the ports of South China, Swatow thus ranked second to Canton.

The chief exports were embroideries and drawn-thread work, mainly to U.S.A.; garlic, oranges, paper, china and earthenware, fresh eggs, live pigs, wood-oil, and wolfram from the mines of eastern Kwangtung. Exports included sugar, mineral oils, fertilizers, rice, embroidery linen, cotton yarn, and piece-goods. Great Britain, Siam, Burma, Germany, and U.S.A. were the leading importers of foreign goods. The export trade was mainly with U.S.A., Hong Kong, Straits Settlements and F.M.S., Siam and French Indo-China.

There is considerable passenger traffic from Swatow, 132,579 in 1936, mainly emigrants to various parts of south-east Asia, especially to Hong Kong and Siam (see pp. 239, 276).

After the commencement of hostilities in 1937, Swatow enjoyed a period of increased prosperity, especially when Amoy and Canton fell into Japanese hands. The city was subjected to naval and aerial bombardments in 1938, and was eventually occupied by the Japanese in June 1939, after which no further full official statistics were issued.

Communications

A single track standard-gauge railway runs from Swatow to Ikoi, a small junk port on the Han kiang, 26 miles from Swatow. The railway was built to connect Swatow with Chaochow, an important district centre, about 2 miles south of Ikoi. The competition from junks and motor boats on the Han kiang has told severely against the railway, which is occupied almost exclusively with passenger traffic. A single-track railway with a 1 ft. 7 in. gauge runs to Chenghai, 10 miles north-west of Swatow; the vehicles are propelled by man-power and carry passengers mainly.

From Swatow motor roads run north to Amoy via Ungkung and to Changlin, north-west to Hingning via Chaochow, and south from Kakchio to Canton via Chaoyang and Hoifung; these roads are in fair to bad condition with numerous ferries, but motor-bus services operate to Changlin and Canton.

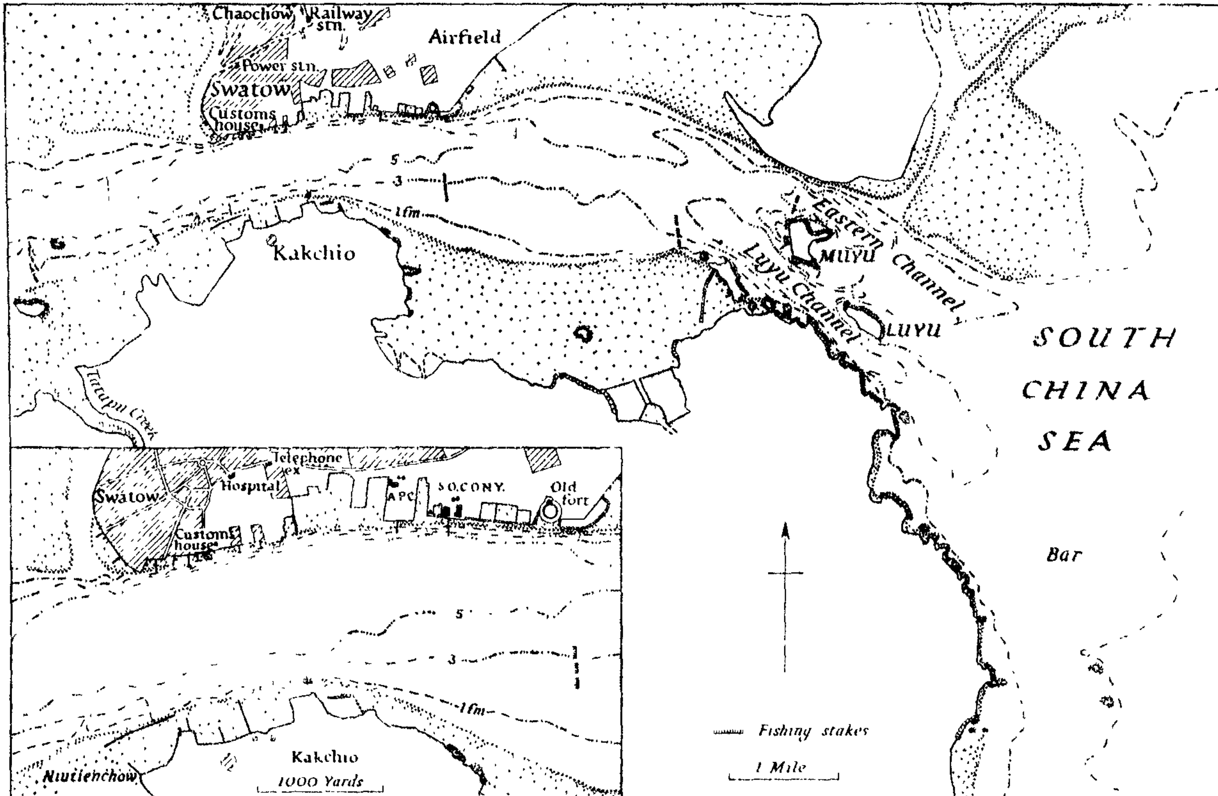


Fig. 50. Swatow and approaches

A.P.C., Asiatic Petroleum Co.; S.O.C.O.N.Y., Standard-Vacuum Oil Co.

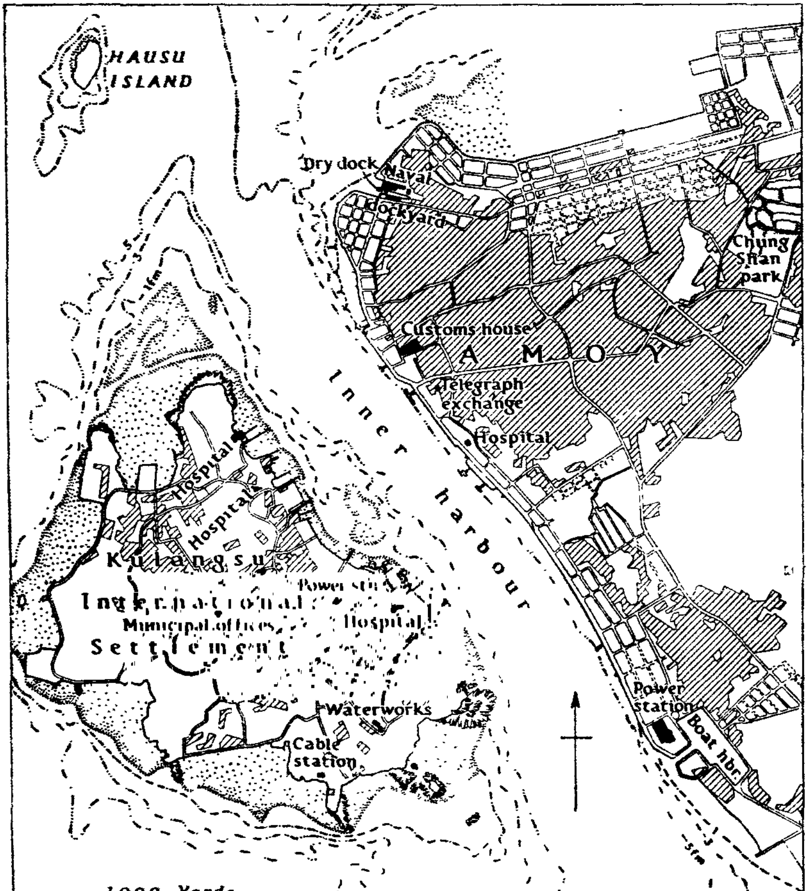

HAUSU ISLAND
Dry dock
Naval dockyard
Chung Shan park
Customs house
A M O Y
Telegraph exchange
Hospital
Inner harbour
Hospital
Hospital
Kulangsu
International Settlement
Municipal offices
Hospital
Waterworks
Cable station
Power station
Boat hbr.
1000 Yards

Fig. 51. Amoy

Water communications are particularly important; large motor launches run regularly up the channel to Kityang, and up the Han kiang to Chaochow, while shallow-draught junks ascend beyond Meihsien to the head of navigation near Hingning. There are also regular launch services to Tathoupo, Chaoyang, and Haimen.

The seaplanes of the China National Aviation Corporation's Shanghai–Canton service called regularly at Swatow, landing and taking off in the north-west corner of the harbour. It was planned to convert the military airfield east of the town into a civil airfield for a service to Canton.

Swatow has a modern automatic telephone service and a long-distance service with several towns nearby. Telegraph lines run to Canton, Amoy, Foochow, Chaochow, and thence to all parts of China. There were two commercial short-wave W/T stations operating in 1937, communicating with Hong Kong, and with Canton, Foochow, and Amoy. At Kakchio in the British consulate there was a W/T station used by British firms in emergencies for communication with Shanghai International Settlement and Hong Kong.

Amoy

Lat. 24° 25′ N., long. 118° 10′ E.	Population (1935), 219,974
Admiralty charts 1764, 1767, 3449	Figs. 51, 52. Plates 67, 68

Amoy is situated on Amoy (Haimen) island at the mouth of the Kiulung kiang, about 150 miles north-east of Swatow. Fukien has had foreign contacts since early times, and Amoy has long been an important trading centre.

Approach and Access

Amoy is available for vessels of any draught at all times, and the seaward approach between Kimoy island and Chinha point on the mainland is wide and deep.

The rise and fall of the tide, especially in the Inner harbour, $16\frac{1}{2}$ ft. at M.H.W.S. and $13\frac{3}{4}$ at M.H.W.N., is considerable, but tides are considerably affected by the force and duration of winds. Tidal streams generally follow the shore line, running 2–3 knots at springs and 1 knot at neaps. The port is occasionally visited by typhoons and strong squalls, but is well sheltered from weather hazards on the whole.

Detailed Description

The Outer harbour, south of Amoy and Kulangsu islands, and extending northward into the channel between Kulangsu and Sungsu peninsula has general depths of 7–16 fm., with good holding ground. There are safe anchorages off the southern end of the channel be tween Amoy and Kulangsu in 6½ fm., off the southern end of Kulangsu in 7–10 fm., and east of Kulangsu in 7–12 fm. Anchorage is prohibited in part of the area south of Kulangsu owing to submarine cables.

The Inner harbour lies between Amoy and Kulangsu islands, and includes also the northern part of the channel between Kulangsu and the mainland. Good anchorages for large vessels can be found south-south-west and south-east of Hausu island in 6–16 fm.

In the Inner harbour there are 17 berths and buoys, which are designated as follows (from the southern end of the harbour):

International Code Flag	Berth or buoy	Official radius	Remarks
		ft.	
Y	Berth	430	
Q	Buoy	520	Owned by the Customs.
V	Berth	420	
N	Buoy	350	Owned by the Customs.
J	,,	300	Owned by O.S.K.
R	Berth	300	
H	Buoy	200	Reserved for Customs vessels.
L	,,	320	Owned by Douglas, Lapraik and Co.
K	Berth	320	
M	,,	280	
G	Buoy	280	Reserved for Customs vessels.
F	,,	300	Owned by Douglas, Lapraik and Co.
W	Berth	300	
Z	,,	180	Reserved for Chinese Navy vessels.
P1	,,	500	
P2	,,	500	
P3	,,	500	

All vessels moor ship unless using buoys. There are three wharves available for shipping, one at Amoy, comprising two pontoons, owned by the China Navigation Co. Ltd., and two at Sungsu, a pile jetty 600 ft. long with a 50-ft. pier at its head, owned by the Asiatic Petroleum Co., and a steel and stone jetty 285 ft. long, with a 50-ft. pier at its head, owned by the Standard-Vacuum Oil Co. (S.O.C.O.N.Y.). Further details are as follows:

	Frontage	Depth at L.W.O.S.T.	Godown storage area	Mooring length
	ft.	ft.	sq. ft.	ft.
C.N. Co. (Amoy)	700	22	51,000	210 (two)
A.P.C. (Sungsu)	600	25	24,000	350
S.O.C.O.N.Y. (Sungsu)	40 (head)	19	30,000	280

The Asiatic Petroleum Co.'s jetty has a hand crane for weights up to 2 tons. In 1938 the Osaka Shosen Kaisha were building a wharf with two pontoons and godowns, off Amoy island, south of the China Navigation Co.'s pontoons.

There are a number of smaller pontoons, jetties, and piers suitable for ships' boats, mostly on Kulangsu, of which the following are worthy of note. A new reinforced concrete jetty at Lingtow, on Kulangsu island, built by the Netherland Harbour Works Company; it has a depth of 12–13 ft. L.W.O.S.T., but a slight rise in the harbour bed about 20 ft. out limits the clear approach at lowest tides to 8 ft. only. A new T-head jetty, owned by the Asiatic Petroleum Co., at Sungsu, which can berth tankers of 320 ft. length and 18 ft. draught at the T-head. Two new pontoons, each 50 ft. long, constructed for the municipal authorities' harbour ferry service, are moored off the bund on Amoy island (depth alongside, 22 ft.) and near Lingtow jetty on Kulangsu (depth alongside, 11 ft.).

Port Facilities

There are no adequate lifting appliances either at Amoy or Kulangsu and all discharge and loading of cargo is by ships' derricks to and from cargo lighters, of which there are over 100 in the port of capacities varying from 10 to 14 tons. The Netherlands Harbour Works have two large lighters and one slightly smaller one which carries sheerlegs capable of lifting 15 tons. There are a number of motor launches, ferry boats, and tugs at the port, while the waterworks own two water-supply barges of 100 and 150 tons respectively.

Ample stocks of coal are available, some 3,000–5,000 tons being kept by the leading coal merchants: this coal is supplied in baskets from lighters. Large stocks of mineral oil are maintained by the Asiatic Petroleum Co. and the Standard-Vacuum Oil Co. at their installations at Sungsu. The A.P.C. has one tank of 1,130 tons Shell Solar oil, three tanks of 4,420 tons kerosine, one tank of

910 tons benzine, and a small quantity of Diesel oil in drums. S.O.C.O.N.Y. has two kerosine and one Diesel oil tanks.

At the north-east corner of Amoy island there is a naval dockyard owned by the Chinese government. The dockyard workshops, which are capable of repairs to ships' hulls and machinery, comprise a plate mill, machine shop, and foundry; neither buildings nor machinery are in good condition. There is also a dry dock with details as follows: extreme length 310 ft., length on blocks 298 ft., width at top 60 ft., width on bottom 34 ft., depth on sill at H.W. neap tides 15 ft. There is also a slipway for vessels up to 60 tons and a berth for launches up to 300 tons' dead-weight. There is a stationary hand crane for loads up to 18 tons, and a movable hand crane for loads up to 10 tons. A narrow gauge (about 2 ft.) railway runs along one side of the dock. The dock as a whole is in a fair state of repair.

Small repairs can be undertaken by the railway workshops at Singpu, and engine repairs by a local Chinese firm which makes small Diesel engines.

Fresh provisions and ships' stores are generally plentiful; an unlimited supply of drinking and boiler water can be obtained from the Amoy Waterworks Co., which delivers water to ships at anchor by its water boats.

The Town

Amoy, which is administered by a mayor and council, was formerly regarded as one of the dirtiest cities of China, but there have been very remarkable improvements of recent years. Narrow crooked alleys have been replaced by broad streets, paved with concrete and well lighted. There are ferro-concrete dwellings, a modern sewage system, an efficient supply of running water. Parks and recreation grounds have replaced slums, while reclamation has proceeded along the waterfront, which has been bunded for a considerable distance. A university has also been established at Amoy with modern buildings and ample playing grounds.

The Amoy Waterworks Co. in 1923 built a reservoir of 2,000,000 gallons' capacity, together with filter-beds, in the hills about 2 miles south-east of the city. The company also supplies Kulangsu, bringing water across in water boats from Amoy, and pumping it to a storage tank for gravity feed to the island. The power station of the Amoy Electric Light Co., which supplies the city, is at the entrance to the Inner harbour. On Kulangsu electric light is sup-

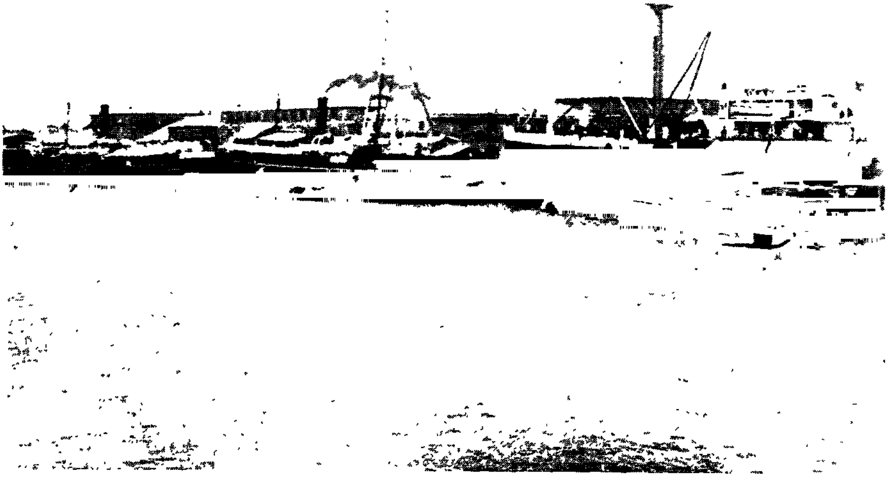


Plate 65. Waterfront, Swatow
Freighters berthed at the pontoons on the north side of the harbour.

Plate 66. Customs road, Swatow
A view of part of southern Swatow, which has been largely rebuilt on modern lines. The building with columns at the left centre is the General Post Office, and the Customs residence compound is on the right.

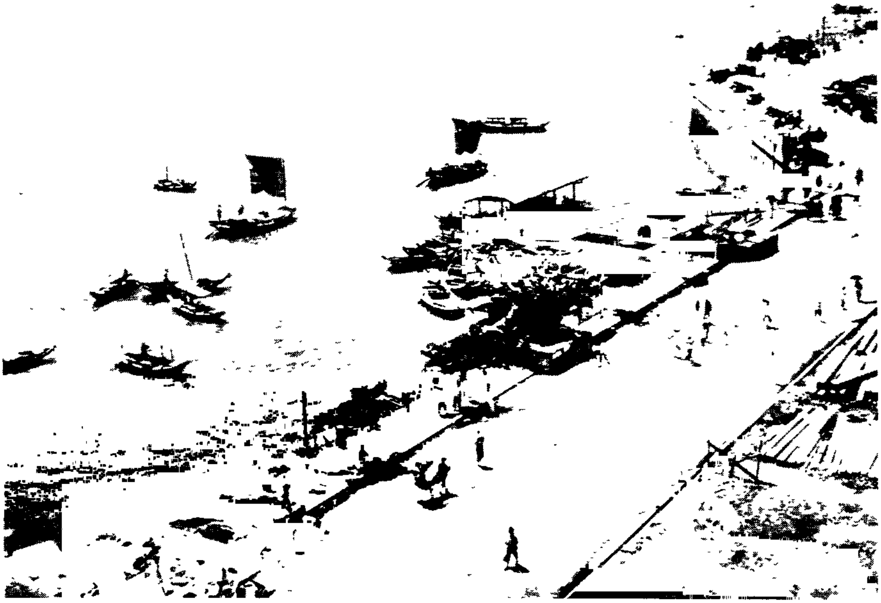


Plate 67. The bund, Amoy

Plate 68. Inner harbour, Amoy

Vessels moored to the buoys in the Inner harbour, with Kulangsu island in the background.

plied by the Kulangsu Chunghwa Electric Light Co. There are modern fire-brigades both at Amoy and at Kulangsu, where fire-hydrant points are installed throughout the settlement.

Since the sanitary arrangements of the city have been improved Amoy ranks as one of the healthiest cities of south-east China. There are four hospitals, including a quarantine hospital in Amoy, and three hospitals on Kulangsu. There was an effective police force of about 1,500 men at Amoy, while the Kulangsu International Settlement had its own police force of about 120 Sikhs and Chinese.

Amoy has no important industries and has always been a commercial rather than an industrial centre. Although most of the foreign business is transacted on Amoy island, almost all the foreign residences are on Kulangsu, which had in 1937 an estimated population of 250 foreigners and 40,000 Chinese. The numbers of Chinese increased to over 100,000 in 1938, owing to an influx of refugees when the Japanese occupied the port.

History

The most important port of Fukien in the Middle Ages was Chüanchow (the Zaiton of Marco Polo). Later Chüanchow steadily declined owing to the silting up of the harbour and its functions as a trading centre passed gradually to Amoy. The Portuguese were at Amoy as early as 1544, but were forcibly expelled some years after owing to their cruelty. British traders had commercial dealings at Amoy until 1757 when an edict of the Manchu emperor, Ch'ien Lung, restricted all foreign trade to Canton ; Spanish ships, however, were still permitted to call at Amoy. After the first Sino-British war (1840–42) the Treaty of Nanking named Amoy as one of the five ports open to trade and residence by foreigners. Most of the foreign traders and officials established themselves on Kulangsu, which was handed over as an International Settlement by China in 1903. Previously there had been a British concession from 1851 to 1852, which was continued as an American concession from 1852 to 1899, and a Japanese concession from 1900 to 1903. The International Settlement was governed by a Municipal Council elected by the foreign ratepayers, as in the case of the International Settlement at Shanghai (see p. 313). In 1929 an agreement was reached between the Chinese government and the treaty powers to the effect that the Municipal Council should consist of five foreign and three Chinese representatives.

The Japanese have occupied Amoy since May 1938. In 1939, following the killing of the pro-Japanese chairman of the Chinese Chamber of Commerce, they landed marines on Kulangsu and made a series of demands on the authorities of the International Settlement. U.S.A., Great Britain, and France also landed troops on the island, but all were withdrawn when an agreement between the Kulangsu Municipal Council and the Japanese Consul-General was reached providing for the addition of Japanese constables to the Settlement police force. As at Shanghai, this attempt at appeasement was followed by further Japanese pressure, which terminated in the Japanese occupation of the International Settlement shortly after the outbreak of the Pacific war. By the treaties of 1943 the British and United States government relinquished their administrative rights in the Kulangsu International Settlement, which thereby reverted to the control of the Chinese government.

Trade

Amoy was long famous as the leading port in China for the tea trade, but deterioration in local teas and keen competition from India and Ceylon led to a steady decline of tea exports. The port has, however, maintained its importance as a trading centre, and the shipping tonnage has trebled since the decade 1874–83. In 1936 the tonnage entering and clearing amounted to 4,990,812, of which rather more than one-half was in domestic trade. The total value of the trade of the port in 1936 was $40·2 million, of which about 60 per cent. was in domestic trade.

The most important exports are fruits, fresh and preserved, sugar, timber, paper, and tea; imports, which account for the bulk of the trade, include fertilizers, mineral oils, textiles, cereals, tobacco, and sundry manufactured goods. Amoy's foreign trade was widely directed, imports coming mainly from Germany, Japan, Hong Kong, N.E.I., U.S.A., and Great Britain; the Straits Settlements and F.M.S. take most of the exports, the Philippine Islands, N.E.I., and Hong Kong ranking next in importance. Amoy was one of the chief ports for emigrant traffic to south-east Asia; in 1936 there were 80,216 departures, of which nearly 28,000 went to the Straits Settlements and F.M.S.

Sino-Japanese hostilities affected Amoy adversely, and the occupation of the port by the Japanese in 1938 led to a complete cessation of business for some months. By 1940, however, considerable improvement had taken place.

Communications

In 1908 work was commenced on a standard-gauge railway line from Sungsu to Changchow, 33 miles inland. By 1916 the line was built only as far as Kiangtungchow on the Kiulung kiang, a distance of 18 miles. The line, which was badly laid, closed down in 1918 and was later dismantled to provide material for road bridges.

From Amoy ferries run to Sungsu and north to Anhai ; from Sungsu a good lightly metalled motor road runs via Changchow and Ungkung to Swatow, while from Anhai a similar road runs north via Chüanchow to Foochow. Motor-bus services run both to Foochow and Swatow ; services also operate locally in Amoy city. Ferry services operate from Amoy to Kulangsu, Sungsu, Tungan, and Anhai, and ply locally among the islands ; launch services run to Chüanchow, Tungshan, and for some distance up the Kiulung kiang.

Amoy was a regular stop on the China National Aviation Corporation's service from Shanghai to Canton ; the aircraft used to land and take off from an area in the northern part of the Inner harbour.

The Amoy telegraph office normally had communication by land lines to Foochow and Swatow and thence to all parts of China ; submarine cables run to Hong Kong, Shanghai (Great Northern Telegraph Co.) and to Saigon (*Administration française des postes et telegraphes*), but the cable station was a relay station only. The Ministry of Communications used to operate the Amoy Central Radio Station, with four transmitters maintaining communication with Shanghai, Swatow, Foochow, Changting, Hong Kong, and Manila ; there were also four small W/T stations on Kulangsu. Both Amoy and Kulangsu have telephone exchanges, the latter system being semi-automatic.

FOOCHOW

Lat. 26° 20′ N., long. 119° 20′ E.	Population (1938), 348,280
Admiralty charts 166, 195, 2400	Figs. 53, 54. Plates 25, 69

Foochow, the capital of the province of Fukien, is situated on the north bank of the Min kiang about 34 miles from the sea. The port comprises two harbours, Mawei (Pagoda) anchorage 9 miles downstream from the city, and Nantai harbour in the river between the southern suburbs of Foochow and the settlement of Nantai on the south bank.

Approach and Access

The mouth of the Min kiang extends for about 11 miles northward of Shafeng chiao (Sand Peak point) but is occupied to a large extent by three islands—Hwangchi shan (Wufu), Weitou tao (Woga), and Chuanshih tao (Sharp Peak island). A bar of hard sand extends for about 8 miles eastward of Hwangchi shan. The least depth on the outer bar is 14 ft., and on the inner bar 10½ ft. while the maximum safe draught crossing the bar at spring tides is 26 ft., and at neap tides 23 ft.; depths in the channel are constantly changing and the river should not be entered without a pilot.

Inside the bar the main channel runs south of Chuanshih tao and Weitou tao; junks use the Woga channel between these two islands, but the channels north of Weitou tao and south of Hwangchi shan, south coast passage, are dangerous for shipping. The river up to Mawei anchorage runs mainly through hilly country, and is dangerous without local knowledge at Chinpai men (Kinpai pass) and Minan men (Mingan pass); vessels of up to 24 ft. draught can generally reach the anchorage. From Mawei to Nantai the Min kiang flows in a bed of loose sand, and the river tends to flow in a number of channels forming many banks and bars dangerous to navigation. In 1918 the Min River Conservancy Board was formed to improve this part of the river; training walls and dykes were constructed and dredging undertaken (Fig. 54). The Conservancy Board was dissolved in 1928, and its work taken over by the provincial government, which continued the work of maintaining and deepening the channel to allow vessels of up to 15 ft. draught at high-water neaps and up to 18 ft. at high-water springs to proceed to Nantai.

The height and direction of tides are influenced by the direction and force of the wind; the tides are generally highest during the north-east monsoon. The spring rise at Mawei is 15 ft. and at Nantai 19 ft.; the neap rises being 12½ ft. and 15 ft. respectively. The flood stream usually runs at 3 knots and the ebb at 4 knots; during freshets, which occur occasionally after heavy summer rains, the ebb stream attains 5 knots, and may be as much as 7 knots in the narrows of Minan men and Chinpai men.

Detailed Description

At Mawei anchorage there is a double line of 18 mooring berths in all, each accommodating vessels up to 470 ft. long; these berths lie near the south bank of the river, running parallel to the shore from Customs point in a north-easterly direction. Almost all the

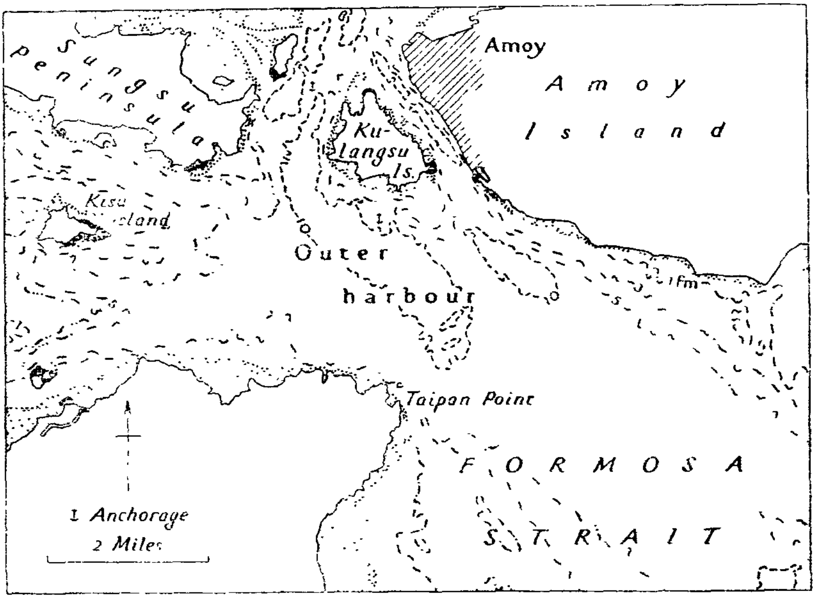


Fig. 52. Approaches to Amoy

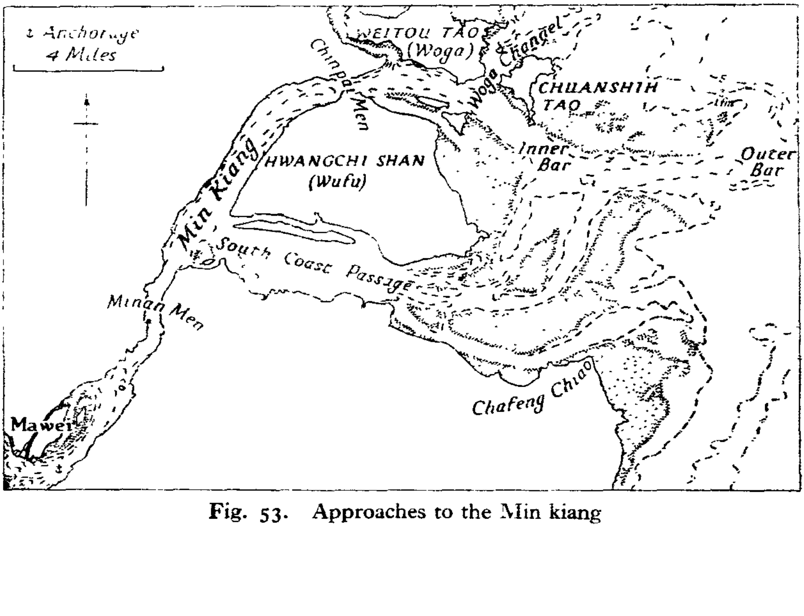


Fig. 53. Approaches to the Min kiang

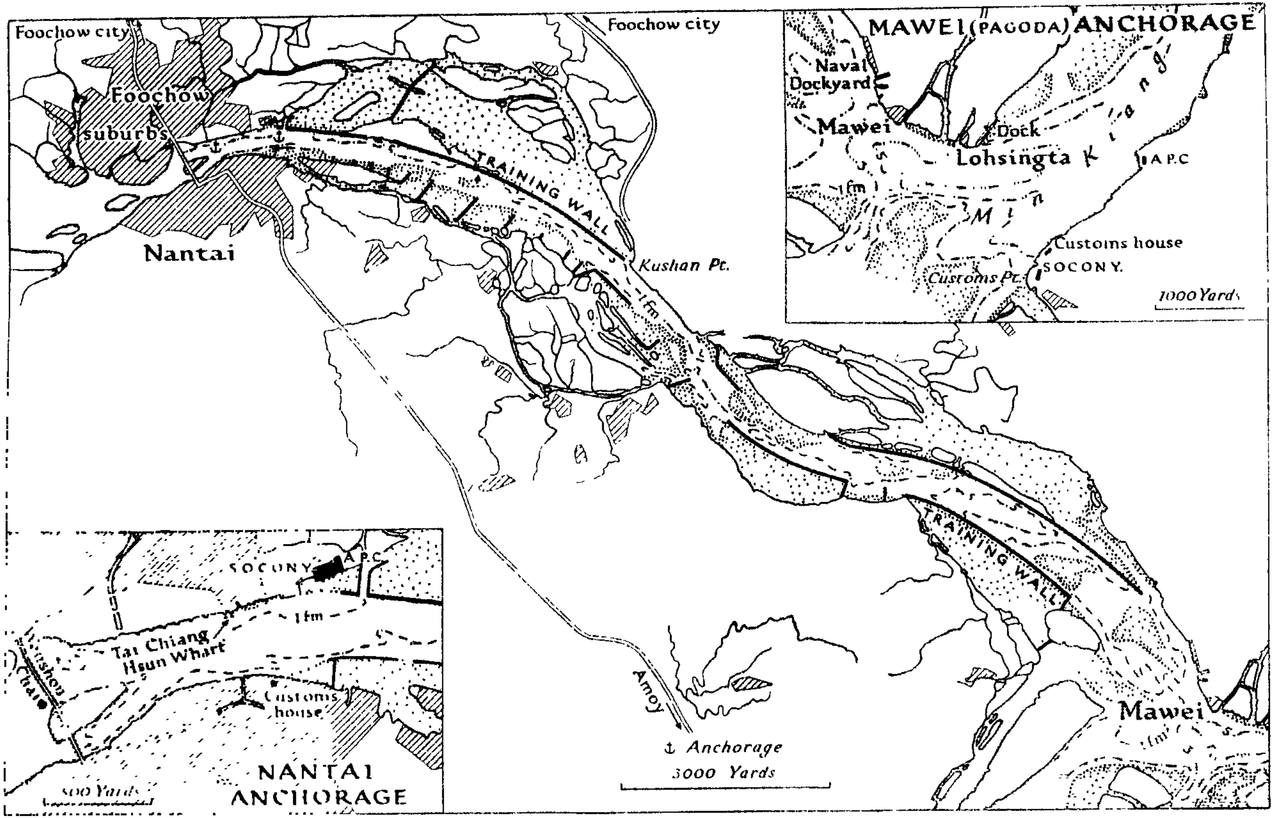


Fig. 54. Foochow (Mawei and Nantai anchorages)
A.P.C., Asiatic Petroleum Co.; S.O.C.O.N.Y., Standard-Vacuum Oil Co.

foreign vessels anchor at Mawei, but in recent years many of the Chinese coasters from Shanghai proceed up river to Nantai. Loading and discharge of cargoes is by lighters, of which there are about 65 altogether at the port.

At Mawei, near Lohsingta, there is a new wharf, with pontoons completed in 1936; it has a frontage of 260 ft., a depth alongside of 23 ft. at L.W.O.S.T. and godown storage area of 397,000 square ft. There are pipe-line jetties at the petroleum companies' installations on the south bank of the river suitable for tankers. The Chinese naval dockyard at Mawei has a wooden wharf 180 ft. long with a depth of 20 ft. alongside. There are steps near the post office at Lohsingta and at the naval dockyard available for small craft at all times; on the south side of the river the steps near the Customs house should be used with caution at low tide.

At Nantai the Tai Chiang Hsun wharf on the Foochow side of the river was completed in 1935; this wharf has a frontage of 182 ft., a depth alongside of 14 ft. and godown storage area of 80,000 square ft. approximately. There are four mooring buoys for coasters in depths of 13 to 18 ft. while certain areas and berths are reserved for launches, junks, and lighters. The building of wharves and other facilities for sea-going vessels at Nantai has been projected, but the difficulties of navigation in the Min kiang indicate that Mawei will still remain the chief anchorage.

Port Facilities

The naval dockyard has three building slips, and a patent slip capable of lifting vessels of about 400 tons, 195 ft. in length. A 50-ton steam sheer-legs on the wharf is in poor condition. The dockyard workshops were in good condition and carried out small repairs for the Chinese navy, but suffered damage in air raids by the Japanese.

There are two government docks, one at Lohsingta, 350 ft. long and 59 ft. wide, which can take vessels of 16 ft. draught and can handle lifts of up to 25 tons, and a new dock at the Mawei dockyard, 375 ft. long, 90 ft. wide, which can take vessels of up to 14 ft. draught. The naval dockyard has salvage appliances and a sea-going tug of 135 tons' displacement.

Drinking-water facilities are poor, as Foochow is still without a waterworks, and at Mawei all water has to be brought by lighter from Minan; river water may be used for boilers. Fresh provisions are plentiful but other ships' stores cannot be obtained.

Bunker coal, mainly from Kaiping and Hongay, can be supplied

in moderate quantities by baskets from lighters. Fuel oil is also available, but there are no bunkering facilities. The Asiatic Petroleum Co. has installations at Mawei and Foochow, with tank capacity of 340 tons Solar oil and 1,270 tons kerosine at Foochow, and 1,140 tons Solar oil and 5,520 tons kerosine at Mawei; about 20 tons of heavy Diesel oil in drums and ample supplies of gasoline are kept. The Standard-Vacuum Oil Co. also has installations at Mawei and Foochow with tank capacity of 6,660 tons kerosine and a stock of about 20 tons of heavy Diesel oil in drums. The Texas Co. has stocks of kerosine in cases.

The Town

Foochow is a walled city situated amongst low hills in the plain two miles from the north bank of the Min kiang. The massive walls have recently been demolished and replaced by a wide motor road. The narrow dirty streets of the walled city are being gradually replaced by wide streets lined with modern buildings. Suburbs with commercial buildings have sprung up on the south side of the city nearer the river.

Foochow is a densely peopled city with a large house-boat population; overcrowding and bad water have led to severe epidemics in the past. Two waterworks schemes are planned, one for Nantai and one for Foochow itself. There are four hospitals at Foochow and one small hospital at Mawei. The Foochow Electric Co. have a plant near the Asiatic Petroleum Co.'s installation which supplies electric light for Foochow at 220 volts and for Nantai at 110 volts. The plant at Mawei naval dockyard supplies the Mawei area. There is a fire-brigade with modern equipment at Nantai.

History

Foochow was one of the five original treaty ports opened by the Treaty of Nanking (1842). The East India Company had made representations for its opening as early as 1830, attracted by the possibility of profitably shipping Bohea tea, which used to be carried overland to Canton. Difficulties of navigation and the hostility of the populace delayed for some ten years extensive export of tea, but by 1880 Foochow had become one of the leading ports for this trade in China, and Mawei anchorage was the terminus of the *Cutty Sark* and other famous tea clippers. No foreign settlement or concession came into being at Foochow but foreigners generally

reside at Nantai, which is connected to the north side of the river by a famous stone bridge, the Wanshou chiao.

Industries

Among the industrial extablishments at Foochow are timber mills, paper mills, and tea factories; there are small home industries engaged in manufacturing fancy goods, weaving cotton cloth, and preparing preserved fruits.

Trade

After 1880 the Chinese tea trade as a whole declined steadily, and the prosperity of Foochow declined; the difficulties of navigation have always told against the port, although the Min kiang affords the main route to the interior of Fukien. In 1936 the total tonnage entering and clearing at Foochow was 2,084,513, of which about 80 per cent. was in domestic trade. The total value of the trade of the port in the same year was $51·4 million, of which just over 80 per cent. was domestic trade.

The more important exports are timber, paper, tea, and fruit; the chief imports were cereals (mainly wheat flour and rice), mineral oils, cotton piece-goods, fertilizers, and various manufactured articles. Imports came mainly from Japan, N.E.I., Germany, and U.S.A.; the majority of the exports went to Hong Kong, Great Britain, Japan, France, and Germany.

With the outbreak of hostilities in 1937 the trade of Foochow showed an appreciable decline. The Chinese blocked the entrance channel to the river and vessels were forced to anchor off Chuanshih tao. The occupation of the port by the Japanese in 1940 reduced foreign trade to very small dimensions.

Communications

There are no railways in the Foochow area, and the Min kiang water routes are still the most important means of communication. Shallow draught motor boats run upstream to Yenping, a distance of 140 miles, while flat-bottomed sampans get almost as far as the Kiangsi border (Plate 152).

Foochow is not well served by roads. The coastal road southwards to Amoy via Putien and Hweian is lightly metalled, but in fair condition; a motor-bus service runs regularly to Amoy. A second coastal road via Mawei and Loyuan north to Futing is projected, but the present track to Futing is in poor condition, subject to floods,

and impassable to motor traffic. A third road runs inland via Kutien to Kienow; except for the part near Foochow this road is good.

The seaplanes of the China National Aviation Corporation used to call regularly at Foochow on their way from Shanghai to Canton; the landing place was off Kushan point in the Min kiang, 3 miles below Foochow.

Telegraph lines run by land to Shanghai, Amoy, and places beyond; there are cables to Shanghai, Hong Kong, and to Tansui (Formosa) from the cable station on Chuanshih tao. There is a commercial W/T station with call signals and a modern dial automatic telephone system serves the city and Nantai.

Santuao

Lat. 26° 40′ N., long. 119° 50′ E. Population, *c.* 10,000
Admiralty charts 1988, 2292

The port of Santuao includes the whole of Santu inlet, which lies about 70 miles north of Foochow. The harbour, one of the finest in the world, is surrounded on all sides by lofty hills, but its effective hinterland is small owing to inadequate communications.

Approach and Access

The entrance to the inlet between the coast north of Loyuan wan and Tungchung peninsula is 2 miles wide and 4 miles long. It is very deep, and through it the tidal streams are said to attain rates of as much as 7 knots, although 3 knots is normal; there are numerous rips and eddies during strong tides.

At the landward end of the entrance is Cone island, which may be passed safely on either side. Aurora channel, to the east, leads to Algerine roads and via Bowring channel to Samsa basin. Waterwitch channel, to the west, south of Chingsan island, leads to Santu anchorage, between Santu tao and the mainland. Beyond Waterwitch channel there are two shallow channels amongst mud-flats leading to the town of Nintai (Ningte). North-east of Chingsan island there are three channels, Merville channel running westward, and Weigall channel and Trinity channel running northward to the settlements of Fuan and Siengdieng. The approximate rise of tides throughout the inlet is 25 ft. at springs and 20 ft. at neaps. Fishing stakes and nets are frequent throughout the inlet, especially in Waterwitch channel.

Plate 69. Nantai, Foochow
The crowded Min kiang with the suburb of Nantai in the background.

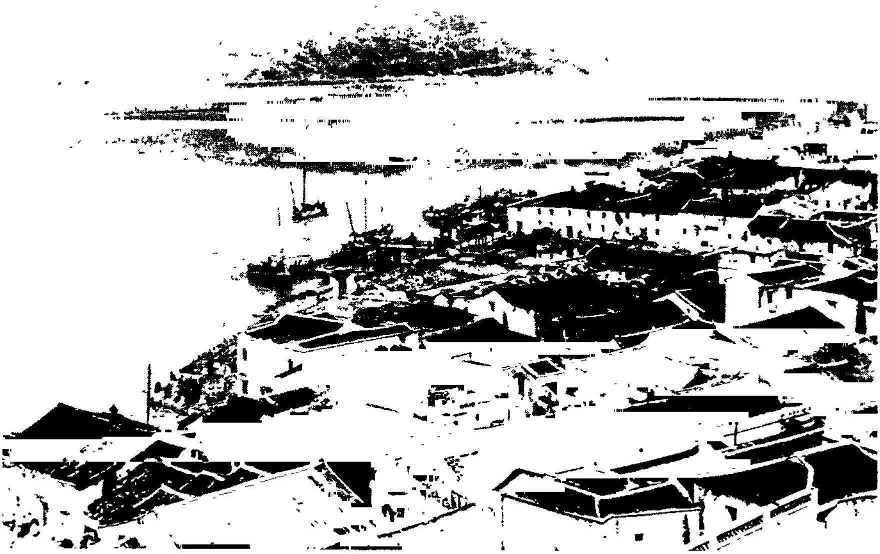


Plate 70. Wenchow harbour
The suburbs outside the north-east of the city and the pontoons in the Ou kiang.

Plate 71. The Yung kiang at Ningpo

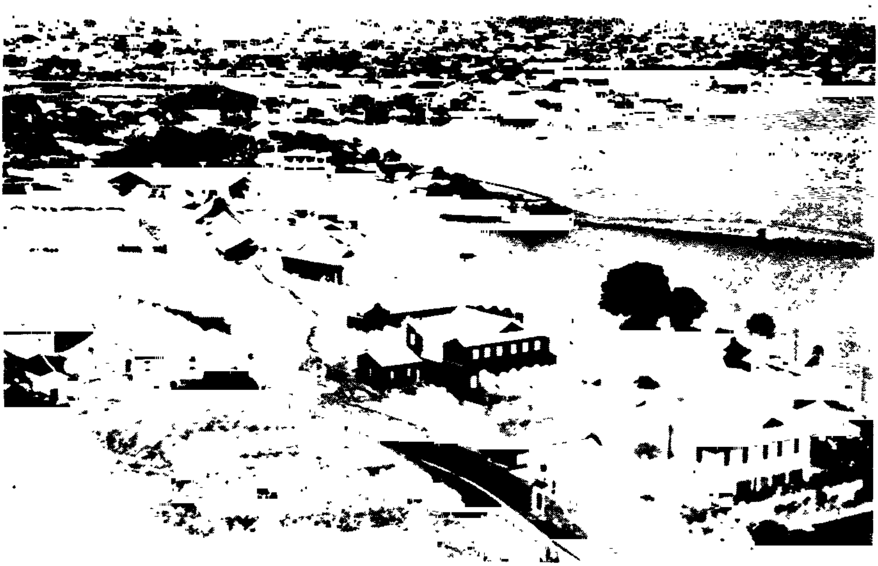


Plate 72. Hangchow and West lake (Si hu)

Detailed Description

Anchorage is possible over almost the whole inlet for large vessels. There is shelter from typhoons, and the bottom is of mud, providing good holding ground.

Santu anchorage is normally used for shipping; the best position is opposite the Customs house in 8–10 fathoms. There are two jetties at Santu: the Asiatic Petroleum Co.'s jetty west of the Customs house, which is altogether 81 ft. long and constructed of stone with a wooden head 45 ft. long, and a stone jetty for sampans east of the Customs house.

Port Facilities

Water is plentiful, but likely to be contaminated, as wells and cesspools are often found in close conjunction, and sanitary arrangements are primitive; supplies of fresh provisions are small. Normally there is no coal, but the Asiatic Petroleum Co. maintained small stocks of fuel oil and gasoline for local use, and has a 5-in. pipe line at its jetty.

The Town

Santuao itself is a small unmodernized Chinese town. It was opened voluntarily by the Chinese government in 1899 as a centre for the exports of tea, but most of its trade is usually trans-shipped to Foochow.

Trade

In 1936 the total tonnage entering and clearing at the port was 89,373, of which seven-eighths was in domestic trade. The total value of the trade of the port was $5·6 million, almost all domestic trade.

Exports include tea, paper, timber, fishery products, while the chief imports are cotton piece-goods, mineral oils, fertilizers, and wheat flour. Germany and Great Britain are the leading countries in Santuao's small foreign trade. The trade of Santuao showed some improvement after 1937 owing to the closing of other ports, and in 1939 foreign trade had risen to $5·6 million, but by 1941 it had fallen off to a negligible quantity owing to the Japanese blockade.

Communications

Santuao is severely handicapped by lack of communications; there is no railway, the only motor road in the district is the Foochow–

Futing road, which passes through Nintai and is of very poor quality. The water communications to inland centres are possible for small craft and for short distances only. The telegraph office on Santu island is connected by submarine cable to the mainland, and has both telegraph and long-distance telephone communication with Foochow.

Wenchow

Lat. 28° 1′ N., long. 120° 38′ E.	Population, *c.* 200,000
Admiralty chart 1763	Fig. 55. Plate 70

Wenchow is situated on the south bank of the Ou kiang, about 20 miles from the river mouth. It serves as a collecting and distributing centre for south-east Chekiang, but as a port has suffered from the competition of Shanghai to the north and the ports of Fukien to the south.

Approach and Access

There are three channels leading to the mouth of the Ou kiang. South passage between Chuanyuanou shan and Chung shan, and Ta men between Tamen shan and Hsiaomen shan are used by junks only; North passage running along the south coast of Tamen shan is the one generally used by shipping. The river entrance is itself divided into two parts by Wenchow flats, which extend south-east for Wenchow tao, but the south entrance is silting up and the north entrance is invariably used. Constant changes occur in the channel of the river as far as Wenchow, but the port is normally accessible to vessels of 15 ft. draught at neap tides and of 18 ft. at spring tides.

The tidal rise at M.H.W.S. is $15\frac{1}{2}$ ft., and at M.H.W.N. $11\frac{3}{4}$ ft. at Wenchow; in the river the in-going stream runs at 3 knots, and the out-going stream at $4\frac{1}{2}$ knots, but may attain 6 knots during summer freshets. The winds greatly affect the rises, ranges, and times of the tide, and there is a seasonal variation of 2–3 ft. in the tide levels in the approaches, the maximum occurring in July to October and the minimum in December to March. The Ou kiang is subject to floods during the summer rains, and Wenchow is visited occasionally by severe typhoons.

Detailed Description

There are no mooring berths available for general shipping in Wenchow, but the customs has a mooring buoy for its own uses

off the Customs house in 10 ft. L.W.O.S.T. There is good anchorage for up to ten vessels of 300 ft. in length off the town in 20 ft. The following wharves (pontoons) are available for shipping :

	Length of frontage	Depth in L.W.O.S.T.	Godown storage area
	ft.	ft.	sq. ft.
China Merchants' S.N. Co. ..	165	20	9,650
Ping An Co.	94	12	2,700
Pao Hua Co.	92	15	7,850
Yung Chan Co.	86	15½	2,700
C.N.A.C.	40	4½	..

The old C.M.S.N. Co. pontoon opposite the city has silted up and the new wharf mentioned above was completed in 1936.

Port Facilities

Good drinking water is obtainable in any quantity delivered by buckets from boats, but only small quantities of fresh provisions are available. There are no tugs or cranes, and no salvage or repair facilities. Coal for bunkering is usually not obtainable, and the stocks of mineral oil are small.

The Town

Wenchow is an ancient walled city, founded at the end of the fourth century. The site is in a well-cultivated plain criss-crossed by canals and surrounded by hills. The walls of stone and brick have been enlarged and rebuilt several times since the fourth century. The old streets are paved with brick and stone, and many run alongside small canals, which have caused Wenchow to be compared with Venice. Of recent years some of the streets have been widened and modernized and new buildings erected, but the town still remains essentially Chinese.

Wenchow was opened to foreign trade in 1877 as a result of the Chefoo Agreement between Great Britain and China. There is no foreign settlement and the foreign residents have been limited to a few missionaries and trade officials.

An efficient electric light system is in operation, but there is no waterworks, and the sewage system is primitive. The city is on the whole healthy, and there are two large mission hospitals and about ten small private hospitals. There has been no industrial develop-

ment and the district is mainly agricultural, but there are local peasant industries of embroidery, cross-stitching, and manufacture of floor-matting.

Trade

Wenchow was once of some importance in the tea trade but has declined considerably. The total tonnage entered and cleared in 1936 was 202,211, of which all but a small fraction was in domestic trade. The total value of the trade of Wenchow in 1936 was $12·1 million, over 90 per cent. in domestic trade.

The chief exports were kittysols (paper parasols), eggs, timber, tea, paper, and wood-oil; the chief imports being sugar, mineral oils, cotton piece-goods, and wheat flour. Imports from abroad came chiefly from Netherlands East Indies, and exports went mainly to the Japanese Empire.

As the Wenchow district was not the scene of military operations until the summer of 1942, its trade improved considerably up to then as it was one of the few seaports remaining to the Chinese. The value of its foreign trade alone in 1940 had increased to $27·0 million; the bulk of the additional trade was with Hong Kong.

Communications

Water routes are very significant in the Wenchow area with its network of canals, many accessible to launches of up to 3 ft. draught at low tide; the most important routes are to Juian (by the Juian canal), to Lishui (by the Ou kiang), and Haimen (by sea).

From Wenchow good main roads run north to Taichow and thence to Ningpo and Hangchow, north of Lishui (Chuchow), and thence to Kinhwa and Hangchow; motor-bus services operate on these roads to link up with the Shanghai–Hanchow–Ningpo and the Chekiang–Kiangsi railways. Another road and a motor-bus service runs south to Juian. The seaplane service of the China National Aviation Corporation service from Shanghai to Canton called at Wenchow regularly in peace-time; the landing place was in the Ou kiang west of the Customs house, where the company had a pontoon for the use of passengers.

The telegraph office is linked by land line to all parts of China, and there is a small local telephone system in addition to a long-distance telephone service to Shanghai, Ningpo, and Hangchow. The W/T station is used mainly for military purposes.

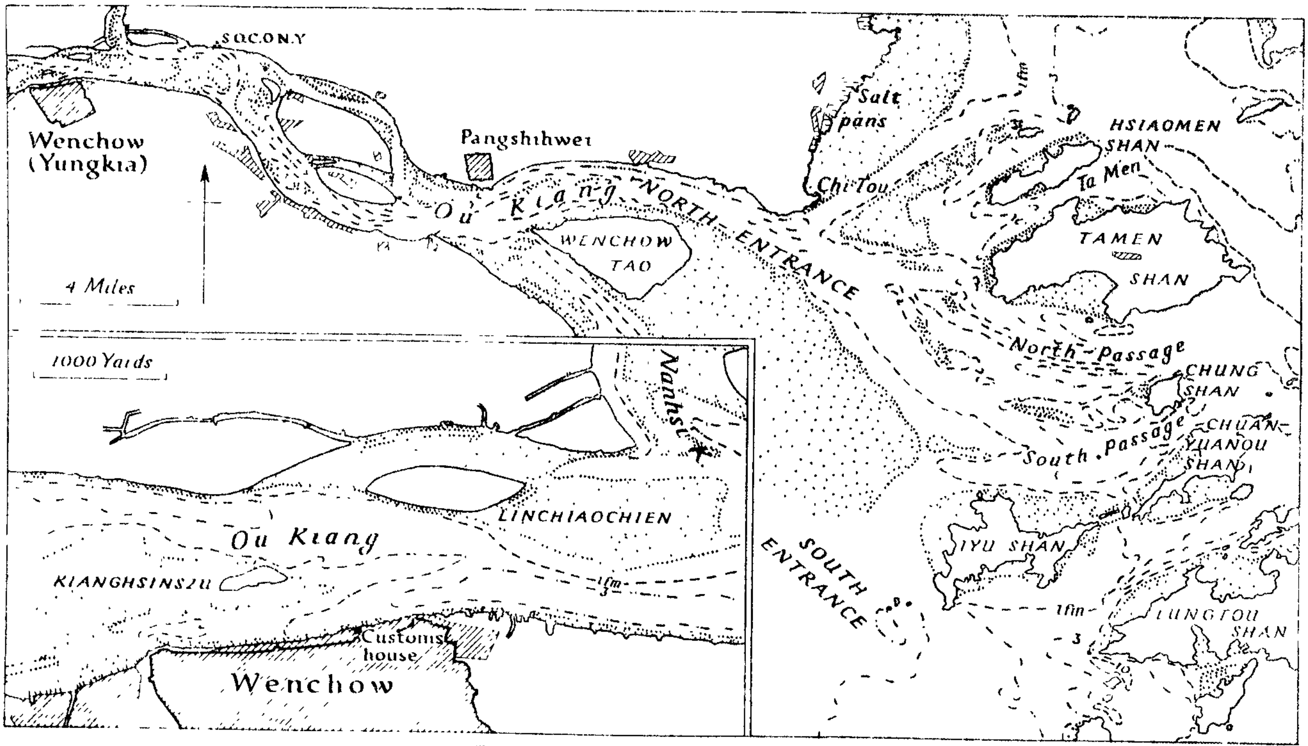


Fig. 55. Wenchow and approaches
S.O.C.O.N.Y., Standard-Vacuum Oil Co.

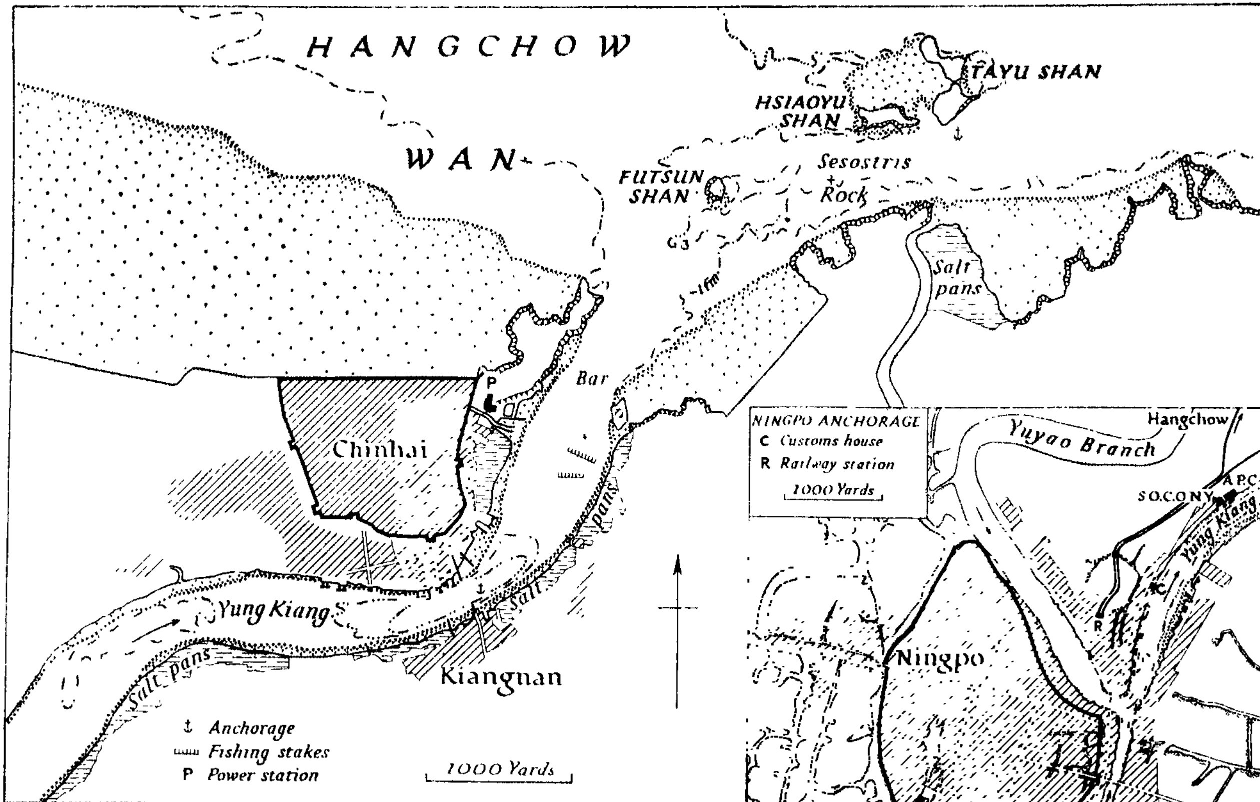


Fig. 56. Ningpo, Chinhai and approaches to the Yung kiang
A.P.C., Asiatic Petroleum Co. ; S.O.C.O.N.Y., Standard-Vacuum Oil Co.

NINGPO

Lat. 29° 53′ N., long. 121° 33′ E. Population, c. 260,000
Admiralty chart 1592 Fig. 56. Plate 17

Ningpo is situated immediately above the confluence of the Yuyao and Fenghwa branches of the Yung kiang, about 12 miles from the sea. The city of Chinhai, the out-port of Ningpo, on the western side of the river mouth, is mainly a fishing centre. Ningpo serves as a trans-shipment port for cargo to the interior of Chekiang and the neighbouring provinces.

Approach and Access

The approach to the mouth of the Yung kiang lies between Changtiao point on the mainland and two islands to the north-east, Tayu shan and Hsiaoyu shan. Vessels awaiting the tide or unable to cross the bar may anchor in about 8 fm. south of Tayu shan. From Hsiaoyu shan the channel with least depth $3\frac{1}{2}$ fm. runs south-east between Futsun shan and Sesostris rock to the river mouth. The bar, which is of soft mud, extends south from Futsun shan for about $1\frac{1}{4}$ miles. The depth on the outer bar at L.W.O.S.T. is $11\frac{1}{2}$ ft. and on the inner bar $10\frac{1}{2}$ ft., but depths may alter considerably; normally vessels not exceeding a draught of 20 ft. can enter at spring tides and $18\frac{1}{2}$ ft. at neap tides. The depths in the river are also subject to alteration and local knowledge is essential for proceeding to Ningpo. The spring rise of tide at Chinhai is $8\frac{1}{2}$ ft. and the neap rise $7\frac{1}{4}$ ft.; the rise of spring tides at Ningpo is $8\frac{3}{4}$ ft. Tidal streams in the river run at 2 to 3 knots. Typhoons may occur during the summer months.

Detailed Description and Port Facilities

Chinhai. Anchorage can be found to the south-east of the city in about 5 fm.; the river is usually crowded with junks and the navigable portion narrow. Discharge and loading of cargoes is carried out alongside two pontoons.

	Frontage	Depth at L.W.O.S.T.	Godown storage area
	ft.	ft.	sq. ft.
China Merchants' S.N. Co. ..	220	16	13,050
San Peh S.N. Co.	177	16	21,300

In addition there are four small pontoons for inland waters steamers and several small wharves for ferry boats and small junks; there is a stone jetty at Kiangnan (Wanchiatang) on the south bank of the river. Fresh water, supplied by bucket from sampans, is very scarce and ship's stores and provisions are available only in small quantities. Stocks of coal and fuel oil are small. There are numerous lighters and launches but no tugs or repair facilities.

Ningpo. At Ningpo there are no mooring buoys, but four berths, in depths of 3½ to 5 fm., are used; No. 1 abreast of the Customs house, No. 2 abreast of the former British consulate, each for vessels of 300 ft. long, No. 3 abreast of the stone yard, and No. 4 abreast of the foreign cemetery, each for vessels of 350 ft. long. There are thirteen T-head pontoon piers, of which the following are the most important:

Pier	Frontage	Depths at L.W.O.S.T.	Godown storage area
	ft.	ft.	sq. ft.
China Navigation Co.	160	14½	11,250
China Merchants' S.N. Co. ..	152	12	11,850
Ningshao	97	17	6,930
San Peh	186	24	3,700
Tah Hsing	156	13½	1,700
Mei Foo	70	14½	9,910
Asiatic Petroleum Co.	108	17	12,220
Standard-Vacuum Oil Co ..	70	17	—

There is a small privately owned dry dock with no sill; the length at bottom is 244 ft., the width 36 ft., and the depth of water at entrance is 12½ ft. at springs and 10 ft. at neaps. The dock has a small slipway for launches, but no lifting gear; small repairs are undertaken here and by one other private firm.

Ample water is supplied by several private firms and delivered by buckets from boats; fresh provisions and ships' stores are plentiful. Stocks of coal, mainly Kaiping and Hongay coal, up to 8,000 tons are kept and delivered by baskets from lighters. The Asiatic Petroleum Co. has 4 tanks and keeps 200 tons of Solar oil and 150 tons of Diesel oil in drums; supplies are also maintained by the Standard-Vacuum Oil Co., which has two tanks. There are pipe lines to both companies' piers.

The Town

Chinhai. Chinhai is a walled town situated on the flat ground to the east of the mouth of the Yung kiang, with suburbs along the river bank. It has a single small hospital and six local fire-brigades.

Ningpo. Ningpo, founded in the tenth century, is situated on flat ground surrounded by many small hills. The walls, which are built of bricks, are some 5 miles in circumference and are surrounded by a large moat on the sides away from the river. These walls were demolished in 1931 and replaced by a macadamized road.

There are many beautiful temples in the city, which possesses a famous library founded in the Ming period. The city has been modernized to a small extent, and is efficiently lit by electricity. The sewage system is still primitive, but the city is fairly healthy; there are two larger and five smaller hospitals. There are no less than eighteen fire-brigades, mostly operated by merchants' organizations. Industrial concerns include textile factories, a flour mill, a match factory, and canneries.

History

Ningpo, known to Marco Polo as Liampo, was visited in 1517 by the Portuguese, Fernando d'Andrade, and a trading centre was opened at Chinhai some years later, which by 1542 had 1,200 Portuguese inhabitants. In that year it was destroyed by the Chinese as a reprisal for ill-treatment of the local inhabitants. At the end of the seventeenth century the East India Company established a factory on Chusan island, 40 miles away, which was abandoned in 1703. In 1841 both Chinhai and Ningpo were occupied by the British and the port was amongst the first five opened to foreign trade by the Treaty of Nanking in 1842. An area known as the Campo, on the west bank of the Yung kiang across the Yuyao branch from Ningpo, but is under Chinese jurisdiction, was set aside as a foreign quarter. The city was captured by the Taiping rebels in 1861 but was occupied by a combined Franco-British force in the next year and handed back to the Imperial government. A monument originally erected by the Imperial government to the British and French officers who fell in the capture of Ningpo in 1862 was re-erected and rededicated in the foreign cemetery in 1933.

Trade

The total tonnage entering and clearing Ningpo (includes Chinhai) in 1936 was 2,989,436, which was almost entirely in domestic trade.

The total value of the trade of the port in 1936 was \$34·8 million, of which over 90 per cent. was domestic trade.

The chief exports were tea, straw hats and mats, bamboo and fishery products ; imports included mineral oils, cotton piece-goods, rice, and sugar. Imports from abroad originated mainly in Hong Kong, Siam, and N.E.I., while the bulk of the few exports went to Hong Kong.

The closing of Shanghai and the lower Yangtze ports and later of the south coast ports gave much impetus to the trade of Ningpo. By 1940 the value of the foreign trade had jumped to \$56·6 million, the greater part of which was due to vastly increased exports to Hong Kong. In spite of the Japanese blockade of the China coast mineral oils and other goods were admitted to Ningpo and forwarded by land routes to ' Free China.'

Communications

Ningpo is the terminus of the Shanghai–Hangchow–Ningpo standard-gauge railway, but through traffic to Shanghai was not possible until 1937, when the Tsientang bridge was built and the last section of the line from Hangchow to Tsaoo constructed (see p. 486). Good roads, along most of which motor-bus services operate, link Ningpo with all parts of Chekiang; the most important of these run to Lishui, to Kinhwa, to Wenchow and to Hangchow. Water routes, both along the coast and through the canal and river systems, are also of much significance. There are telegraph offices at both Chinhai and Ningpo which are connected to the general telegraph system ; a W/T station on the north bank of the river was in operation in 1941. There is a local telephone system of some 1,500 telephones.

HANGCHOW

Lat. 30° 17′ N., long. 120° 11′ E.	Population (1933), 529,663
Admiralty charts 1199, 3522	Plate 72

Hangchow, the capital of Chekiang, is situated about 20 miles up the Tsientang kiang, which flows into Hangchow wan immediately south of the Yangtze delta. Owing to difficulties of navigation, Hangchow scarcely functions as a port.

Approach and Access

Hangchow wan is comparatively shoal : in the southern part there are depths of $2\frac{3}{4}$ to 4 fm. Safe navigation ends at Rambler island ; from that point boats and junks of not more than 3 ft.

draught only can proceed upstream to Hangchow, owing to the bore in the estuary which makes navigation very difficult. The bore, which may attain a height of 19 ft. and a speed of 13 knots, brings traffic in the estuary to a complete standstill and is especially dangerous at spring tides.

Port Facilities

At Zakow, the rail-head, about 4 miles south-west of Hangchow, there are six small wharves for steam launches. The Asiatic Petroleum Co. and the Standard-Vacuum Oil Co. have installations there with stocks of fuel and lubricating oils and kerosine; ample stocks of hard and soft coal are available at the city. Fresh water may be obtained from the Hangchow water supplies; at Konzenchiao, which is the inland port of the city, the Grand Canal is used to supply water for drinking and other purposes.

The Town

The city is situated about 2 miles north of the Tsientang kiang, with the beautiful West lake (Si hu) on its western side surrounded by picturesque hills. The lake is dotted with islets, some of which are joined to the shore by causeways. Many temples, shrines, and pagodas are set on the islets and amongst the hills in situations of unbelievable beauty. The walls, built of brick and stone, are fully 13 miles in circumference and pierced by ten gates; the western wall along the lake shore had been largely demolished and replaced by a promenade and gardens.

The administrative and commercial centre, with many modern buildings, is in the southern part of the city and has spread outside the walls to the river in the direction of Zakow. An area north of the city along the Grand Canal near Konzenchiao was set aside as a foreign settlement and has been laid out on modern lines; a separate Japanese settlement adjoins it on the north. Hangchow still maintains its traditions of learning; the National University of Chekiang, Hangchow Christian College, and the National School of Fine Arts are the most important centres of higher education in the city; all of these had to move into 'Free China' after the Japanese occupation. Hangchow is on the whole a healthy city with a modern waterworks; there are seven hospitals in the city and its vicinity. There is a large electric power plant at Zakow which supplies the Hangchow region with electricity.

History

Hangchow is one of the most ancient of the cities of China, the earliest reference to it dating back to 2198 B.C. Under the southern Sung dynasty Hangchow became famous, being the dynastic capital from 1134–1275. It was then known as Linan, but Marco Polo, who described it as 'the finest and noblest city of the world,' called it Quinsay. The Sung emperors beautified the city, taking every advantage of its picturesque surroundings. It then became, and still remains, an important centre of Buddhism, and a recent survey disclosed the existence of nearly one thousand Buddhist monasteries, temples, and shrines there. During the Taiping rebellion the city was almost destroyed, but it has recovered much of its former prosperity. It was opened as a treaty port in 1896 as a result of the Treaty of Shimonoseki between China and Japan.

Industries

Hangchow was long famous for its silk fabrics which are still manufactured there. Modern industrial establishments include cotton mills, ironworks, match factories, paper mills, printing presses, knitting factories, armament works, and rice mills.

Trade

Customs statistics for Hangchow cover merchandise moving by launch on the Grand Canal only, and are thus not completely indicative of the trade of the district, much of which passes through Shanghai. The tonnage of shipping for 1936 was 78,795, all in domestic trade; the value of foreign trade, all recorded as imports, was $2·8 million; exports, mainly tea, went through Shanghai. Domestic trade amounted to $21·3 million. The chief imports, sugar, artificial silk yarn, and mineral oils, came mainly from Japan and N.E.I. After the opening of hostilities in the Yangtze delta in 1937 no further trade statistics were issued.

Communications

The Grand Canal provides one of the most important means of communication in the Hangchow district; steam launches towing cargo-boats run from Konzenchiao via Kashing to Shanghai with cargo, while regular passenger services operate to Soochow and Shanghai. Shallow draught junks play over the network of waterways, on the plain north and east of the city, and for some distance up to Tsientang kiang.

The most important roads from Hangchow run northwards to Shanghai, via Haining and Chapu, and to Nanking via Wukang and Ihing; motor-bus services operate on both roads, but the former is reported in poor condition. Other motor roads run west to Hweichow, south to Kienteh and Chenghsien.

From Hangchow standard-gauge railway lines radiate in three directions, north to Shanghai and to Nanking via the Kashing–Soochow loop, and east across the Tsientang bridge to Ningpo (Plate 132); these two lines comprise the Shanghai–Hangchow–Ningpo railway. The third line is the Chekiang–Kiangsi railway, which runs through Nanchang and Pinghsiang to link up with the Canton–Hankow line.

Hangchow is connected to the general telegraph service and is connected by long-distance telephone with Shanghai; there is also an automatic telephone system. In 1935 there were four broadcasting stations operating in Hangchow, of which the largest was owned by the provincial government of Chekiang.

Soochow

Lat. 31° 19′ N., long. 120° 43′ E. Population (1934), 389,797
Plate 73

Soochow (Wuhsien) is situated on the plain of the Yangtze delta near the eastern shore of Tai hu, about 50 miles west of Shanghai. Soochow, though listed as a port by the Maritime Customs, cannot be regarded as a seaport; its foreign trade is due to the desire of local merchants to avoid wharfage and conservancy dues at Shanghai, which is the natural outlet of the region.

The Town

Soochow is an ancient city, dating from the sixth century, and ranked with Hangchow as one of the most beautiful in China. Like Hangchow, it was almost entirely destroyed during the Taiping rebellion, but since then it has recovered much of its former prosperity. Its ancient traditions as a centre of culture are maintained by Soochow University and the Soochow School of Fine Arts. Soochow was opened to foreign trade along with Hangchow under the provisions of the Treaty of Shimonoseki between China and Japan.

Soochow is enclosed by a rectangular wall about 10 miles in extent, and surrounded by a canal on all four sides. Bridges span the canal and carry roads into the city through eleven gates, five of which

have been recently opened; within the walls there are additional canals, intersecting at intervals. Suburbs have developed outside the city walls mainly on the west side. Areas outside the south wall of the city were set aside as foreign and Japanese settlements, which are connected to the railway station north of the city by a modern road skirting the south and west walls. Roads and streets inside and outside the walls have been widened and modernized during recent years. There is no waterworks in Soochow, and water supplies are taken from wells and canals; two mission hospitals and three other hospitals are situated in the city and its suburbs. The Soochow Electric Company, which supplies a large area around the city, has one large and four small thermal electric power plants, while there are a number of smaller plants also in operation, serving industrial concerns.

Industries

There has been some industrial development in Soochow along modern lines. The manufacture of silk fabric is several centuries old, but as a home industry is disappearing; a modern development is the weaving of satin, in which numerous small factories are engaged. Cotton mills, silk filatures, match factories, paper mills, knitting factories, and flour mills are also in operation; the manufacture of leather goods, matting, embroidery, and grasscloth is also carried on to some extent as home industries.

Trade

In 1936 a tonnage of 104,814 was recorded for shipping entering and leaving Soochow, all in domestic trade. The total value of the trade in 1936 was $7·3 million, of which $4·4 million was foreign trade, all imports. The leading imports, mainly from Japan and N.E.I., were sugar, artificial silk yarn, mineral oils, and fertilizers; exports abroad pass through Shanghai. The occupation of the Yangtze delta by the Japanese in 1937 led to a complete cessation of foreign trade at Soochow.

Communications

Soochow is particularly well provided with waterways, most of which are accessible to vessels of 6 ft. draught and 16 ft. beam. The Grand Canal connects Soochow with Hangchow, Kashing, and Huchow to the south and with Wusih and Chinkiang to the north; other water routes run to Changshu, Liuho, and Shanghai. The

most important motor roads are those to Wusih, to Changshu which links up with the Shanghai–Wusih highway, and to Chapu via Kashing; roads of poorer quality radiate to neighbouring settlements of the Yangtze delta plain. Soochow is connected to Shanghai and Nanking by the single-track standard-gauge Shanghai–Nanking railway. A loop line connecting the Shanghai–Nanking and Shanghai–Hangchow–Ningpo railways runs from Soochow southwards to Kashing. The city is linked up with the general telegraph system and has a local telephone system operated by the Ministry of Communications.

For Bibliographical Note, see pp. 427–8

Chapter VIII

SHANGHAI AND THE YANGTZE PORTS[1]

Shanghai : Chinkiang : Nanking : Wuhu : Kiukiang : Hankow : Yochow (Chenglin) : Changsha : Shasi : Ichang : Wanhsien : Chungking.

SHANGHAI

Lat. 31° 14′ N., long. 121° 29′ E.	Population (1936 est.), 3,746,768
Admiralty charts 389, 1601, 1602	Figs. 60, 61, 62. Plates 74–80

Shanghai, which in 1935 ranked sixth amongst the ports of the world, is situated on the left bank of the Whangpoo river, 14 miles above its confluence with the Yangtze kiang at Woosung. Shanghai, the distributing centre for the Yangtze valley, a rich hinterland of some 750,000 square miles with a population of about 180,000,000, is the commercial, industrial, and financial metropolis of China.

Approach and Access

The Yangtze estuary. The Yangtze kiang enters the East China sea northward of Yangtze cape in three channels, but only one of these, South channel, is available to sea-going vessels. North entrance, on the northern side of Tsungming island, is used by junks only, while North channel, immediately south of Tsungming island and banks, has been closed to navigation since 1931. South channel, which runs NNW to Woosung, lies between the mainland coast and a group of mud-flats and low islets, terminating eastward in Tungsha banks (Fig. 57).

At the seaward end South channel is itself divided by Tungsha shoal into South fork and North fork, the latter being the deeper. The Yangtze bar (Fairy flats), over 2 miles wide, extends south-east from Tungsha banks to the mainland, and plays a leading part in determining the draught of vessels which can enter the Yangtze, and may at times have a depth of only 18 ft. From the Yangtze bar to Woosung, South channel is deep and wide. In the whole estuary,

[1] The port descriptions are largely those of the ports as they were in July 1937, before the outbreak of the Sino-Japanese war, though occasional references are made to later developments ; conditions in many places must be radically different, especially with regard to port facilities and communications.

however, the banks and depths are constantly changing and the light and buoys marking the channel have to be moved from time to time; local knowledge is essential for safe navigation. There are strong rotary tidal streams, and caution should be exercised, especially in thick weather.

The Whangpoo river. The entrance to the Whangpoo lies between Woosung spit on the north and an area of flats to the south; on both sides training walls have been constructed as part of the conservancy programme. There is a safe open roadstead off the entrance in the Yangtze, of which an area 6 miles long by 1½–2 miles wide has depth of over 30 ft. Vessels that may not berth at Shanghai anchor here in good holding ground of mud or fine sand, and transfer cargo to lighters, which are towed up the Yangtze to Shanghai; strong winds prevent lighterage for about 20 per cent. of the time.

From Woosung to Shanghai there is a deep regular channel with smooth curves. The conservancy normal lines, within which the channel must be kept, are about 1,400 ft. apart in the upper harbour, and increase to 2,400 ft. apart at Woosung. These are the ultimate limits to which harbour works may be built and to which riparian landowners have legal rights. The least depths below lowest low water at various points in the channel, as determined by survey made before the outbreak of hostilities in 1937, were as follows:

	ft.
Outer bar (Woosung)	31
Astraea channel (Gough island)	30
Black Point crossing (Chiu creek)	25½
Wayside	28
Bund crossing	27
Kiangnan Arsenal crossing	26½
Powder magazine crossing	26
Crossing above cement works	26

At Woosung the tidal rise is 11¼ ft. at M.H.W.S. and 8¾ ft. at M.H.W.N., and at Shanghai 10½ ft. at M.H.W.S. and 8 ft. at M.H.W.N. Tidal streams in the Whangpoo are usually from 1½–2½ knots, but may reach 4½ knots at spring tides and after rain. Typhoons are liable to occur in the delta area during summer, but rarely cause any damage, and fog may be experienced in the Whangpoo from October to June for 5–7 days in each month.

Conservancy

The Yangtze has been calculated to bring down about 500,000,000 tons of solid matter annually. Much of this is discharged into the

sea in a finely divided state, but there always has been a considerable deposition of silt in the estuarine area, which has resulted in the formation of deltaic islands, mud-flats, shoals, and bars; in such a fashion has the great Yangtze delta been built up over a period of many thousands of years (see vol. i, pp. 101–3). The drainage channels of the delta, of which the Whangpoo is the most significant, have been in a comparatively unstable state, meandering and splitting in the normal manner of rivers in a low alluvial plain. To native junks and to early foreign vessels the navigational problems presented were few, but after the middle of the nineteenth century, when the size and tonnage of vessels began to increase and when Shanghai began to grow in importance, difficulties were experienced more and more frequently.

From the Sung period onward efforts had been made from time to time to clear the channels about Shanghai, but the problem was now very much greater. As early as 1863 a petition was made by the leading shipping firms to Sir Robert Hart, Inspector-General of the Maritime Customs, pointing out the importance of improving the approaches to the port. The Chinese authorities at that time refused to take any action, but in 1889–91, following further agitation, a small amount of dredging was undertaken. In 1905 the Chinese government established the Whangpoo Conservancy Board, under a Dutch engineer-in-chief, J. de Rijke, to tackle the whole problem. In that year the bar at the mouth of the Whangpoo (Woosung bar) had a least depth of only 15 ft. (Fig. 60). Three miles up the river divided into two channels, Junk channel of 8 ft. depth and Ship channel with a least depth of 10–11 ft. (Woosung inner bar). From here to Shanghai the channel was wide but there were several shoals; in the harbour itself the deep channel was too narrow, at two points the whole river was too narrow and a new bar was commencing to form. Within four years the Woosung bar was greatly improved and the Woosung inner bar no longer existed; this was brought about by damming the old Ship channel and dredging the Junk channel into a new first-class waterway, Astraea channel (Fig. 60). Under De Rijke (1906–10) and his successors, H. von Heidenstam (1910–28) and Dr H. Chatley (1928–37), the Whangpoo was canalized as far as Kiangnan Arsenal, a distance of 20 miles, and a channel formed with a navigable depth of 28 ft. L.W.O.S.T. The major work of the Whangpoo Conservancy Board in the period 1905–37 comprised the following:

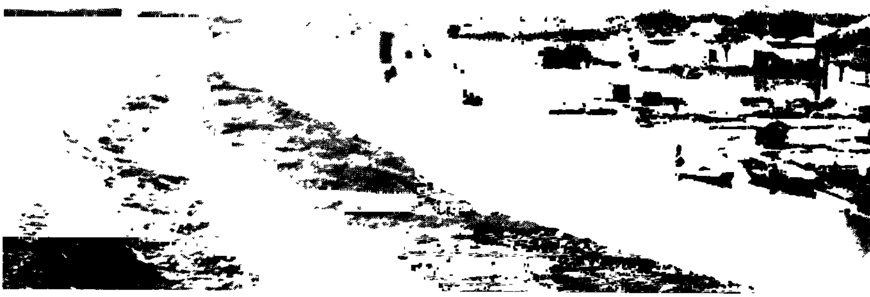


Plate 73. City wall and canal, Soochow

Plate 74. China Navigation Company's wharf, Shanghai

A river steamer berthed at one of the pontoons at French bund wharf. A warship is moored in mid-stream, and the industrial suburb of Pootung can be seen across the Whangpoo river in the right distance.

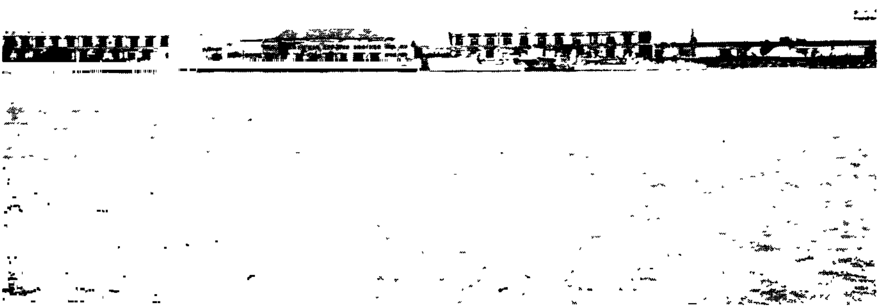


Plate 75. Jukong wharf, Shanghai
The Jukong wharf on the Whangpoo river below Point island.

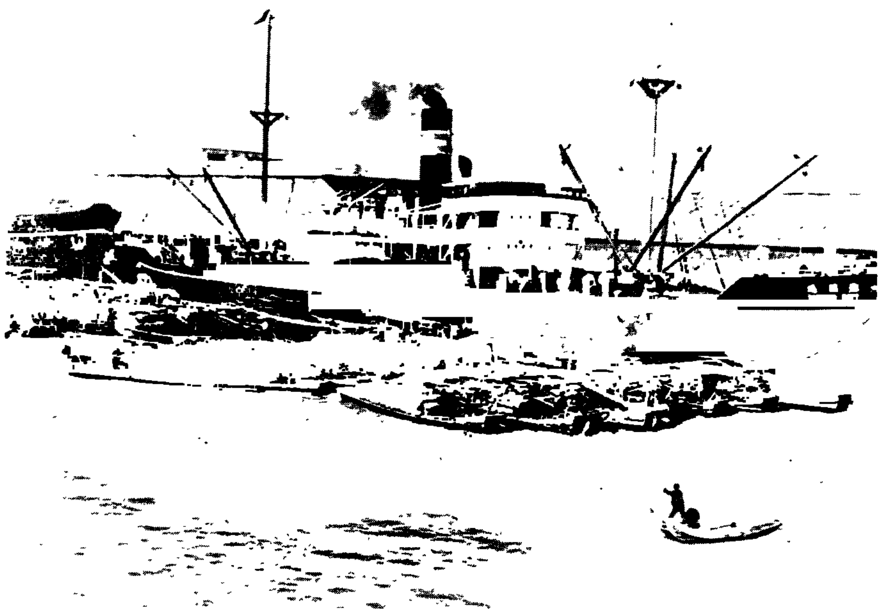


Plate 76. N.Y.K. wharf, Shanghai
Japanese freighters berthed at one of the *Nippon Yusen Kaisha* wharves on the Yangtzepoo side of the Whangpoo river.

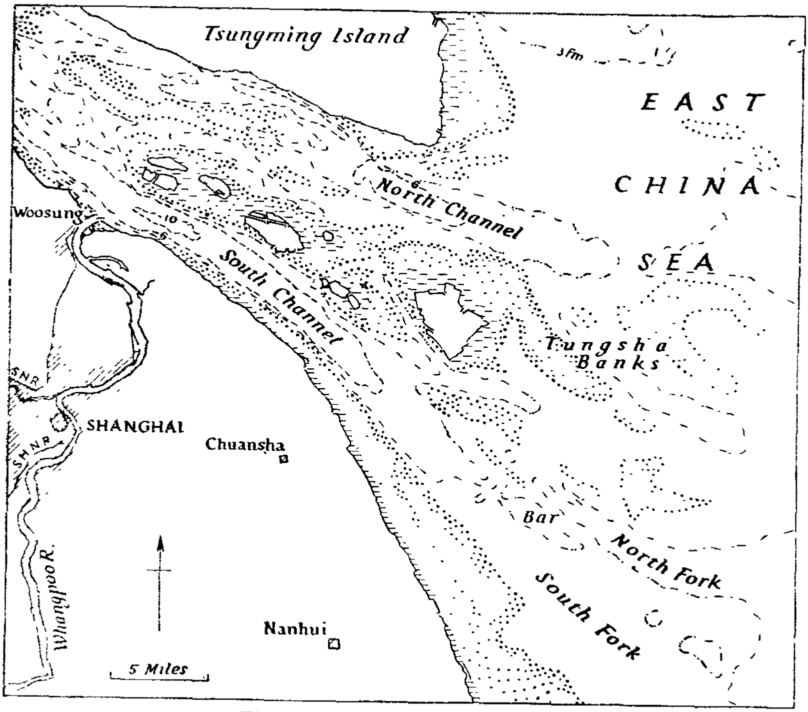


Fig. 57. The Yangtze estuary

S.H.N.R., Shanghai–Hangchow–Ningpo railway; S.N.R., Shanghai–Nanking railway.

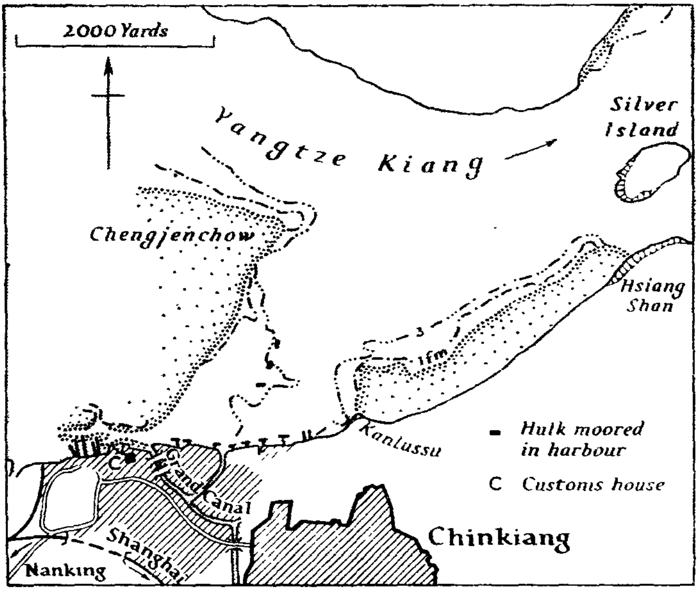


Fig. 58. Chinkiang

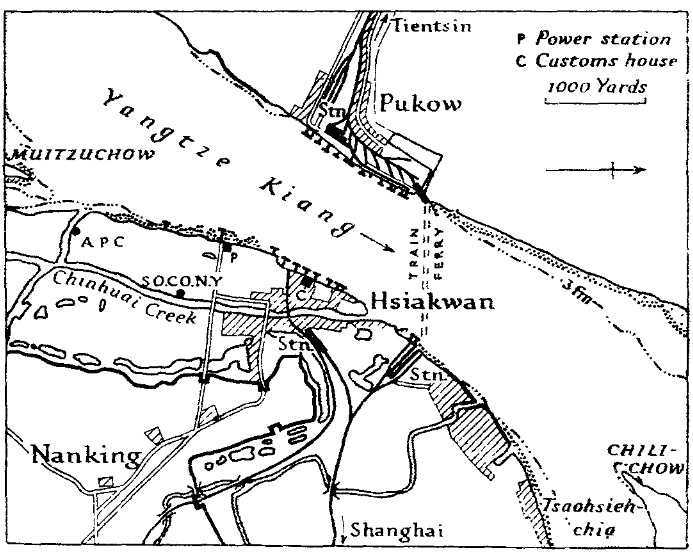


Fig. 59. Nanking (Pukow and Hsiakwan)

A.P.C., Asiatic Petroleum Co.; S.O.C.O.N.Y., Standard-Vacuum Oil Co.

(1) The building of training walls on both sides of the Whangpoo mouth.

(2) The formation of the new Astraea channel.

(3) The construction of training works at various points along the river bank, notably at the Pootung point and opposite Kiangnan Arsenal.

(4) Numerous reclamations and bundings.

(5) Maintenance dredging, exceeding 62 million cubic yards, practically all of which has been deposited ashore.

(6) Dredging Soochow creek, the principal Whangpoo tributary, in conjunction with the Shanghai City Government, for a distance of 13 miles upstream.

In addition the Board commenced in 1935 the even greater task of dredging a 27-ft. minimum channel across the Yangtze bar at Fairy flats, involving the removal of some 40,000,000 tons of silt at a rate of 5,000,000 tons per year.

The Whangpoo Conservancy Board in 1937 consisted of a representative of the Chinese Ministry of Foreign Affairs, the Commissioner of Customs at Shanghai, and the Harbour Master of Shanghai. There was also a Consultative Board of six port experts, one from each of the following countries: U.S.A., Great Britain, Japan, France, the Netherlands, and one appointed by the Chinese Chamber of Commerce. The Board, which had entire control of its funds and finance, derived its income from a Conservancy Surtax of 3 per cent. on the gross receipts of the Shanghai Maritime Customs, a 0·15 per cent. tax on duty-free goods, a 0·45 per cent. tax on treasure (i.e. gold, silver, and coins), and the proceeds from the disposal of foreshore lands.

The duties of the Board are to provide and maintain a deep channel from the sea to Shanghai, to undertake new works to improve the channel, and to help riparian owners in dredging in front of their wharves.

When the Japanese occupied Shanghai in 1937 they seized the Board's equipment and no dredging was carried out between August 1937 and April 1940, when the renewal of operations, under Japanese control, was allowed. The silting which occurred during the suspension of dredging did not affect shipping to any great extent, though it did cause a worsening of summer and autumn floods in parts of the International Settlement and the French Concession.

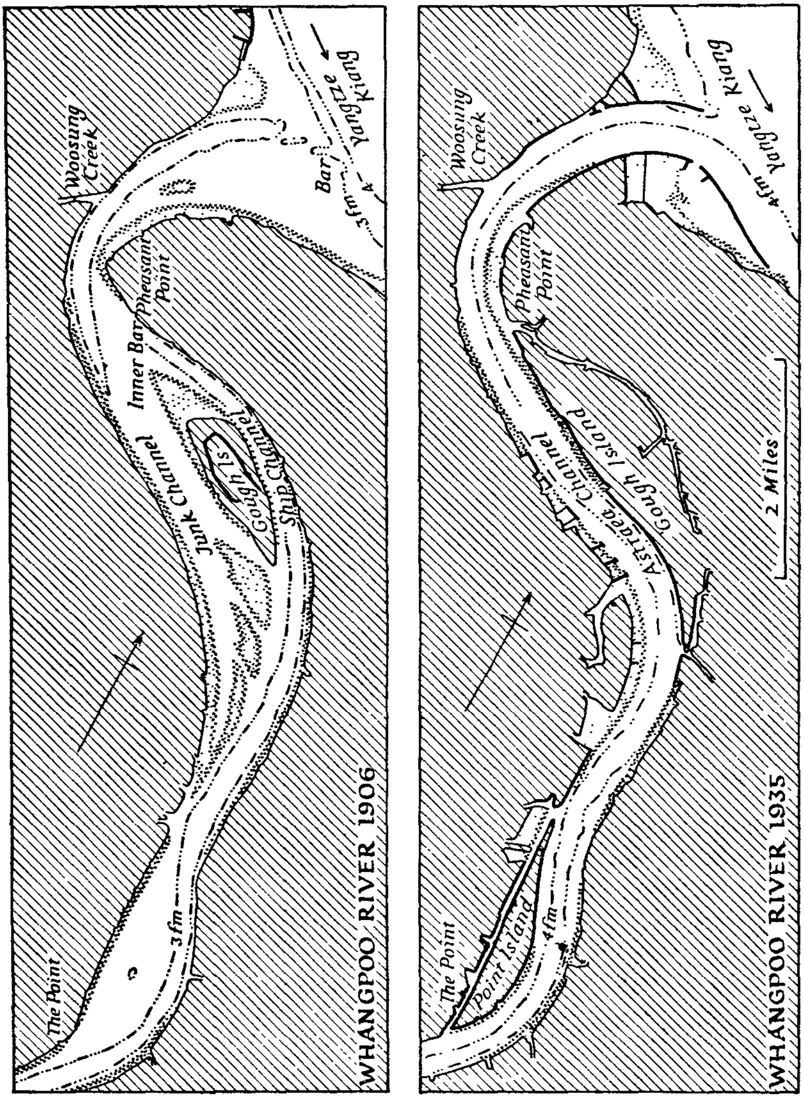


Fig. 60. The Whangpoo river, 1906 and 1935

Based on Smith, C. A. Middleton, 'The Port of Shanghai,' *Dock and Harbour Authority*, vol. xviii, p 69 (London, 1938)

Detailed Description

The official limits of Shanghai harbour are from Woosung breakwater to Changchiatang creek, Lunghwa, a distance of 22 miles. The area of the harbour between the conservancy normal lines is about 4,810 acres, of which 3,230 acres has depths of 18 ft. or more. The total river is divided up as follows :

	ft.
Served by pontoons	48,650
Served by pile wharves	26,345
Bunding without pontoons or wharves	73,055
Unimproved bank	99,800
Creek mouths	5,715
Total	253,475

Of the frontage 36,670 ft. is British-owned, 36,670 ft. is privately owned by Chinese, 23,615 ft. is Japanese-owned, 13,730 ft. is American-owned, and 3,130 ft. is French-owned.

Almost all vessels at Shanghai are berthed at wharves and pontoons, but there were 157 mooring buoys at the port, providing 68 head-and-stern mooring berths. The buoys, of which 111 were owned by the Maritime Customs, were located in the most important part of the harbour, from Tungkow creek upstream for a distance of 9 miles to Kiangnan Arsenal. This stretch of the river is divided into: Upper Sections A, B, and C; Sections I–XI, numbered downstream; and Lower Section. The part of the river between Upper Section A and Upper Section B, and also Sections I, V, and IX are set aside as swinging berths.

Details of the principal wharves and pontoons available for shipping at Shanghai are given on pp. 302–5.

Previous to 1937 the Chinese Municipality of Greater Shanghai had in hand a project for making Woosung and the lower stretches of the river the leading shipping centre of the Whangpoo, as part of the planning of the extension of Shanghai northward (see p. 313). While the Woosung area has the obvious advantages of a shorter journey from the sea and unlimited space for port and urban development, the established interests and investments of the present Shanghai are so great that there is unlikely to be a wholesale shift of trade and industry downstream. Admittedly extensions on these lines will mean increased competition, but the present harbour and city of Shanghai are so overcrowded that expansion is a necessity and should ultimately be to the advantage of Shanghai harbour as a whole.

The harbour has accommodated 156 merchant ships and 22 warships simultaneously. The largest vessel using the port in 1937 was the Canadian Pacific Railway Company's *Empress of Japan*, 664 ft. in length, 83·6 ft. in breadth, 26,032 gross tonnage, with a draught of 29 ft. 9 in. The deepest draught vessel entering the port in the same year was the British oil tanker *G.S. Walden*, with a draught of 32 ft. 1 in. The Canadian Pacific Railway Company's

Details of Wharves, Shanghai, 1937

Wharf	Length of frontage	Length of quayage	Least depth at L.W.O.S.T.	Area of godown space	Location	Normal user	Remarks
	ft.	ft.	ft.	sq. ft.			
Woosung							
1. Chung Hsing Coal Mining Co., Woosung wharf	920	390	15	..	S	Various	Three pontoons. Open storage, 30,000 tons.
2. Shanghai-Nanking Railway, Woosung wharf	1,700	862	17	58,500	S	Various	Pile wharf and one pontoon. Two cranes. Open storage, 30,000 tons.
Gough Island							
3. Kwang Hwa Petroleum Co.	1,630	1,060	22	45,650	P	Owners	Pile wharf and two pontoons.
4. Texas Co.	630	576	20	54,800	P	Owners and various oil tankers	Two pontoons.
5. Asiatic Petroleum Co., Gough Island wharf	2,105	240	25	20,400	P	Owners	One pontoon.
Lower Section							
6. Jukong wharf	2,480	1,180	30	92,400	S	Various	Two pile wharves, each 590 ft. long. Godown capacity, 28,000 tons.
7. Jukong wharf, lighter harbour	..	1,330	..	..	S	Lighters.	
8. Fish market wharf	600	560	15	4,445	S	Fish hongs.	Three pontoons. Godown capacity, 28,000 tons.
9. China Oil Co., Tungkow warehouse wharf	550	450	30	42,446	P	Various	Three pontoons.
10. Standard-Vacuum Oil Co., wharf	3,700	1,220	27	295,043	P	Owners and various oil tankers	Pile wharf, 710 ft. long, and three pontoons.
Section XI							
11. Asiatic Petroleum Co., lower wharf	1,473	840	26	85,067	P	Owners	Four pontoons.
12. Mitsui Bussan Kaisha, lower wharf	757	757	21	..	P	Owners	Pile wharf.
Section X							
13. American Securities, Lay Road wharf	395	225	..	120,773	S	Various Upper Yangtze steamers	Pile wharf. 5-ton steam crane. Godown capacity, 31,916 tons.
14. Ocean S.S. Co., Holt's wharf	2,426	2,426	29	407,200	P	Blue Funnel, Java-China-Japan and Glen lines	Pile wharf. One 5-ton crane and four 2-ton cranes. Godown capacity, 33,940 tons.
15. Asiatic Petroleum Co., upper wharf	525	240	28	27,035	P	Owners	One pontoon.

16. Kailan Mining Administration, wharf	710	600	27	44,800	P	Owners	Three pontoons. Godown capacity, 9,925 tons, and open storage, coal, 86,000 tons.
17. China Merchants' S.N. Co., Yangtze wharf	570	500	24	195,500	P	Owners	Two pontoons. Godown capacity, 73,300 tons.
18. China Merchants' S.N. Co., Eastern wharf	2,198	1,395	26	185,600	P	Owners	Eight pontoons. Godown capacity, 105,550 tons, and open storage, 25,000 tons.
19. Nippon Yusen Kaisha, Pootung wharf. Extends also into Section IX	1,064	1,000	25	175,172	P	Owners	Pile wharf. 5-ton steam travelling crane. Godown capacity, 50,000 tons.
Section IX							
20. Dairen Kisen Kaisha, Whangpoo wharf	1,020	1,020	21	289,512	S	Owners	Pile wharf. Godown capacity, 30,180 tons, and open storage, 50,000 tons.
21. Liddle Bros. and Co., Birt's wharf	No data				S	No data	
22. Shanghai and Hongkew Wharf Co., Pootung wharf east	1,310	1,294	26	536,812	P	Various mail and cargo lines	Pile wharf. 4-ton and 20-ton hand cranes, and 2-ton and 10-ton steam cranes. Godown capacity, 159,060 tons.
23. Shanghai and Hongkew Wharf Co., Pootung wharf west	1,240	1,230	22	374,851	P		Pile wharf. 5-ton steam travelling crane. Godown capacity, 133,110 tons.
Section VIII							
24. Osaka Shosen Kaisha, Yangtzepoo wharf	874	834	20	199,390	S	Owners	Pile wharf. Godown capacity, 75,000 tons.
25. Nippon Yusen Kaisha, Wayside wharf	900	900	30	390,869	S	Owners	Pile wharf. 5-ton steam travelling crane. Godown capacity, 100,500 tons.
26. Shanghai and Hongkew Wharf Co., old Ningpo wharf	792	777	22	281,894	S	Indo-China S.N. Co.	Five pontoons. Godown capacity, 87,980 tons.
27. Mitsui Bussan Kaisha, upper wharf	1,532	600	16	..	P	Owners	Three pontoons.
Section VII							
28. China Merchants' S.N. Co., lower wharf	850	835	28	312,220	S	Lloyd Triestino, French Mail, Ben, and Rickmers Lines	Four pontoons. 3½-ton and 18-ton floating cranes. Godown capacity, 94,666 tons, and open storage 30,000 tons.
29. Shanghai and Hongkew Wharf Co., lighter harbour	..	822	15	..	S	Lighters	2-ton transporter, 6-ton versatile crane, and 10-ton electric travelling crane.

Wharf	Length of frontage	Length of quayage	Least depth at L.W.O.S.T.	Area of godown space	Location	Normal user	Remarks
	ft.	ft.	ft.	sq. ft.			
30. Shanghai and Hongkew Wharf Co., Hongkew and Hunt's wharves. Extends also into Section VI	2,023	2,023	24	1,281,914	S	Norddeutscher-Lloyd Canadian Pacific Railway, and various mail lines	Pile wharf. Six cranes of 1 to 5 tons, and 6-ton motor travelling crane. Godown capacity, 378,925 tons.
31. Schillers Co., Tai Dong wharf	474	364	5	..	P	Various coal companies	Three pontoons. Two godowns.
Section V							
32. China Merchants' S.N. Co., Central wharf	510	405	18	192,471	S	French and other mail lines	Three pontoons. Godown capacity, 56,440 tons.
33. Nippon Yusen Kaisha, Central (Mail) wharf	840	665	34	388,738	S	Owners	Three pontoons. Godown capacity, 100,000 tons.
Section II							
34. China Navigation Co., French bund wharf	1,220	774	10	471,410	S	Owners	Five pontoons. Storage, 44,500 tons.
35. China Merchants' S.N. Co., Kinleeyuen wharf. Extends also into Section I	1,749	1,431	21	338,324	S	Owners	Twelve pontoons. Godown capacity, 101,500 tons.
36. Mackenzie and Co., wharf	847	690	22	385,897	P	Various	Six pontoons. Godown capacity, 96,500 tons.
37. China Navigation Co., Pootung wharf	1,070	580	15	307,150	P	Owners	Pile wharf and two pontoons. Godown capacity, 32,700 tons.
Section I							
38. Jardine, Matheson and Co., Lanitu wharf	..	400	20	..	P	Owners	Two pontoons.
39. Hoong Shing Wharf and Godown Co., wharf	600	552	17	..	P	San Peh S.N. Co.	Four pontoons. Fourteen godowns.
40. China Navigation Co., Watung wharf	1,565	840	8	255,210	P	Owners	Five pontoons. Storage, 27,700 tons.
Upper Section C							
41. Shanghai City Government wharves	..	1,670	8	..	S	Ningshao S.S. Co., and various	Nine pontoons. Three godowns.

42. Shanghai City Government, Tatung wharf	440	440	8	..	S	Tatung S.S. Co.	Three pontoons.
43. China Merchants' S.N. Co., Yangchiatu wharf	1,000	800	20	340,225	P	Owners	Five pontoons. Godown capacity, 85,000 tons.
44. Chinese Eastern Railway, Yangchiatu wharf	450	300	26	65,792	P	Dairen Kisen Kaisha	Two pontoons. Godown capacity, 5,260 tons, and open storage, 4,000 tons.
45. Okura and Co., Laopatu wharf	490	270	24	52,456	P	Various North China companies	Pile wharf. Godown capacity, 16,050 tons, and open storage, 20,000 tons.
46. Nissin Kisen Kaisha wharf	1,214	915	16	184,794	P	Owners	Pile wharf and one pontoon. Godown capacity, 31,384 tons.
47. Rioka Soko Kebushiki Kaisha, Changchiapang wharf	970	908	14	408,611	P	Owners	Pile wharf. One crane. Godown capacity, 122,500 tons.
48. Nee Tai Shing Coal Co., north wharf	900	873	20	..	P	Various	Pile wharf. Open storage, coal, 50,000 tons.
49. Rioka Soko Kebushiki Kaisha, Tungchiatu middle wharf	900	290	28	..	P	Nissin Kisen Kaisha	Pile wharf. Open storage, coal, 100,000 tons.
50. Nee Tai Shing Coal Co., south wharf	1,981	1,500	22	237,188	P	Various	Pile wharf. 14-ton travelling crane. Godown capacity, 85,000 tons, and open storage, 50,000 tons.
Upper Section B							
51. Yoong Ling Co., wharf	600	453	25	..	P	Various	Four pontoons.
52. Han Yeh Ping Iron and Coal Co., wharf	960	710	24	..	P	Various	Pile wharf.
53. Kian Gwan and Co., wharf	1,129	322	31	7,920	P	Owners	Pile wharf 200 ft. long, and one pontoon. Tank storage, 6,970 tons.
Upper Section A							
54. Robert Dollar Co., wharf	1,400	1,270	24	175,592	P	Dollar and American mail lines	Pile wharf. 5-ton motor crane and 12-ton steam travelling crane. Godown capacity, 50,000 tons.
55. Chung Hsing Coal Mining Co., Pootung wharf	1,250	500	26	..	P	Various	Two pontoons.
56. Woo Hsing Wharf and Godown Co., wharf	890	890	23	450,000	P	Various	Three pontoons. Open storage, 20,000 tons.
57. Chung Hwa Wharf Co., Chouchiatu wharf	1,876	960	22	..	P	Various	Three pontoons. Open storage, 200,000 tons.
Upper Section							
58. Kailan Mining Administration, upper (Jihhuichiang) wharf	499	476	30	..	S	Owners	Pile wharf. Two cranes and loading and discharging mechanical travelling grab. Open storage, coal, 86,000 tons.
59. Pei Piao Coal Mining Co., wharf	1,000	400	26	..	S	Various	Two pontoons.

S = Shanghai side. P = Pootung side.

Source: Maritime Customs, *Report of the Marine Department*, 1937, pp. 124-9, and plan facing p. 120 (Shanghai, 1938).

Empress of Britain, 733·3 ft. in length, 97·8 ft. in breadth, 42,348 gross tonnage, with 30·6 ft. draught on arrival was the largest vessel piloted to Woosung in 1937.

Since the Japanese occupation of Shanghai, Jukong wharf has been renamed Iida wharf, additional sections to existing wharves have been added and further wharves planned. This new development took place mainly in the Woosung area, with the object of attracting shipping from the vicinity of the International Settlement.

Port Facilities

For a great port Shanghai is singularly deficient in mechanical equipment; much of the cargo is handled by lighters from the outer side of ships at wharves or from vessels moored in mid-stream. There are six large sheer-legs with capacities of from 75 to 120 tons, nine stationary cranes for weights up to 20 tons, and included coaling equipment at the K.M.A. wharf and the Riverside power station, twenty-four travelling cranes for serving lighters and native boats for weights up to 14 tons, ten floating cranes with capacities of from 10 to 65 tons, and a varying number of small cranes.

The following are the details of docks at Shanghai:

	Length	Breadth	Depth on sill at H.W.O.S.T.
Shanghai Dockyards Ltd.	ft.	ft.	ft.
Tungkadoo (Tungchiatu) Dock ..	55	67	16
International Dock	528	65	23
Yangtzepoo Dry Dock No. 1 ..	584	62	20
Yangtzepoo Dry Dock No. 2 ..	342	61	16
Old Dock	399	53	16
The Kiangnan Dock and Engineering Works			
Dock No. 1	545	62	20
Dock No. 2	502	61	23
Dock No. 3	640	80	23½
Société Franco-Chinoise des Constructions Métalliques et Mécaniques			
Kiousin Dock	242	35	12
Whangpoo Conservancy Board			
Changhuapang Dock	190	40	16
Kung Mow Engineering and Shipbuilding Works, Ltd.			
Pingan Dock	268	38	13

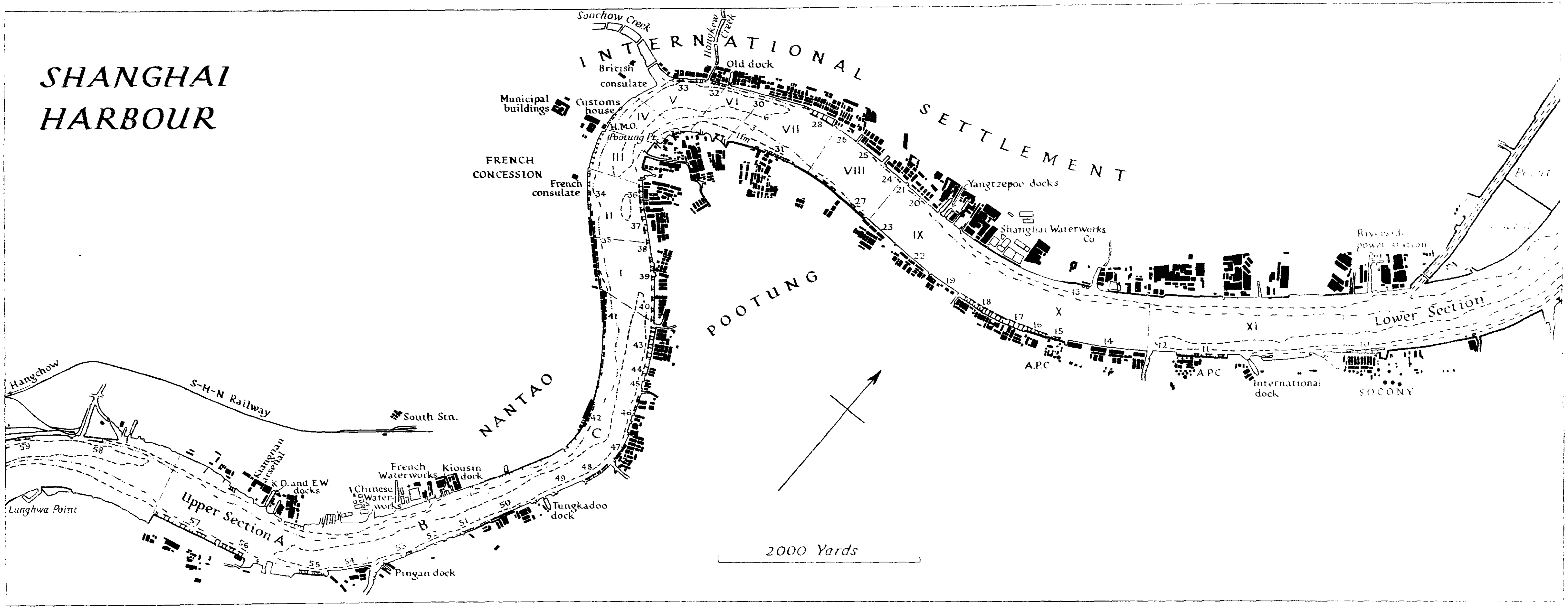


Fig. 61. Shanghai harbour

The Roman numerals I–XI have reference to the numbered sections at the port (see p. 301); the Arabic numerals to the wharves listed in the table on pp. 302–5; B and C denote the lower subdivisions of upper section.

A.P.C., Asiatic Petroleum Co.; K.D. and E.W., Kiangnan Dock and Engineering Works; S.O.C.O.N.Y., Standard-Vacuum Oil Co.; S-H-N Railway, Shanghai-Hangchow-Ningpo Railway.

These docks have berths for building large vessels and slips for building smaller vessels. There are a large number of slipways and building yards throughout the harbour, of which those owned by Moller's Engineering Works, Ltd., are the most important for the construction and repair of small craft. Many of the docks and slips were not available after the occupation of the port by the Japanese, who were reported to be undertaking the construction of a large dock.

Repairs of all kinds can be undertaken by the yards mentioned above, and there are five firms which undertake salvage operations of any class.

There are about 150 tugs, tenders, and steam-launches for harbour work owned by the Shanghai Tug and Lighter Co., Moller's Towages, Ltd., and other companies, as well as 28,000 native cargo-boats, 281 lighters, 45 oil-fuel barges, and 11 bulk gasoline barges. The Maritime Customs has two fully-equipped fire floats, *Poochi* and *Huning*, manned by a special harbour fire-brigade.

Very large stocks of coal, up to 150,000 tons suitable for sea-going vessels, are maintained by the K.M.A. and other coal companies. The K.M.A. and the Shanghai Power Co. at their Riverside station have mechanical apparatus for handling coal, otherwise bunkering is by hand labour from lighters and wharves. The installations of the oil companies are on the right bank of the river at Pootung and on Gough island; large stocks of fuel oil are kept. Details of the installations are as follows:

	No. of tanks	Storage capacity
Asiatic Petroleum Co.		
Pootung (Upper wharf)	10	7,712,000 U.S. gallons
Pootung (Lower wharf)	16	34,622 tons
Gough Island	10	23,174 tons
Kwang Hwa Petroleum Co.		
Gough Island	24	21,750,211 U.S. gallons
Standard-Vacuum Oil Co.		
Pootung	28	89,400 tons
Texas Co.		
Gough Island	38	14,099,533 U.S. gallons

Ship's stores and provisions of all kinds may be had at the port and fresh water is supplied to ships berthed on the Shanghai side

from taps and hydrants on the wharves, and to vessels anchored in the stream by the water-boats of the Shanghai Waterworks; many coastal steamers and launches use river water for boilers.

The Town

The original Settlement area, bounded roughly by the Whangpoo, Soochow creek, Thibet road, which occupies the former position of what was known as Defence creek, and Yangkingpang creek, the northern boundary of the French Concession, is the commercial centre of Shanghai. The consulates, banks and insurance offices, business houses and shops, clubs and churches, are located here. The streets were laid out in a rectangular pattern, running north-south and east-west. Many were no more than 22 ft. wide, and since have had to be widened at great expense to accommodate a great increase in urban traffic. The Bund, a tree-shaded boulevard on the waterfront, is a fine thoroughfare backed by large modern multi-storied buildings, of which the Cathay Hotel and the Hong Kong and Shanghai Bank are the most imposing. Of the newer portions of the International Settlement, Yangtzepoo is a shipping and industrial centre, while the area west of Thibet road is mainly residential with an industrial section bordering Soochow creek. The French Concession is largely administrative and commercial in the small portion nearest the Whangpoo, but is almost entirely residential to the west. In both the Settlement and the Concession the newer areas are well laid out with wide tree-lined main thoroughfares, but the Chinese occupied areas are characterized by a maze of small insanitary streets, with mean overcrowded houses. To the west and north of the foreign-controlled territory the External Roads areas are largely residential; building activities here have been very prominent of recent years and there are many fine European style houses with gardens bordering tree-lined avenues.

The old Chinese city was surrounded by a brick-faced wall over 3 miles in circumference, which was pulled down in 1912–13. It is a characteristically Chinese town of narrow paved streets with many small shops and stores.

The Chinese suburbs of Chapei and Nantao, primarily devoted to small-scale industries, are characterized by a close irregular network of narrow badly-drained streets and are densely peopled. Pootung across the Whangpoo is mainly a shipping and industrial area, but the proposed new Civic Centre at Kiangwan is planned as a residential and administrative quarter. The Shanghai area has

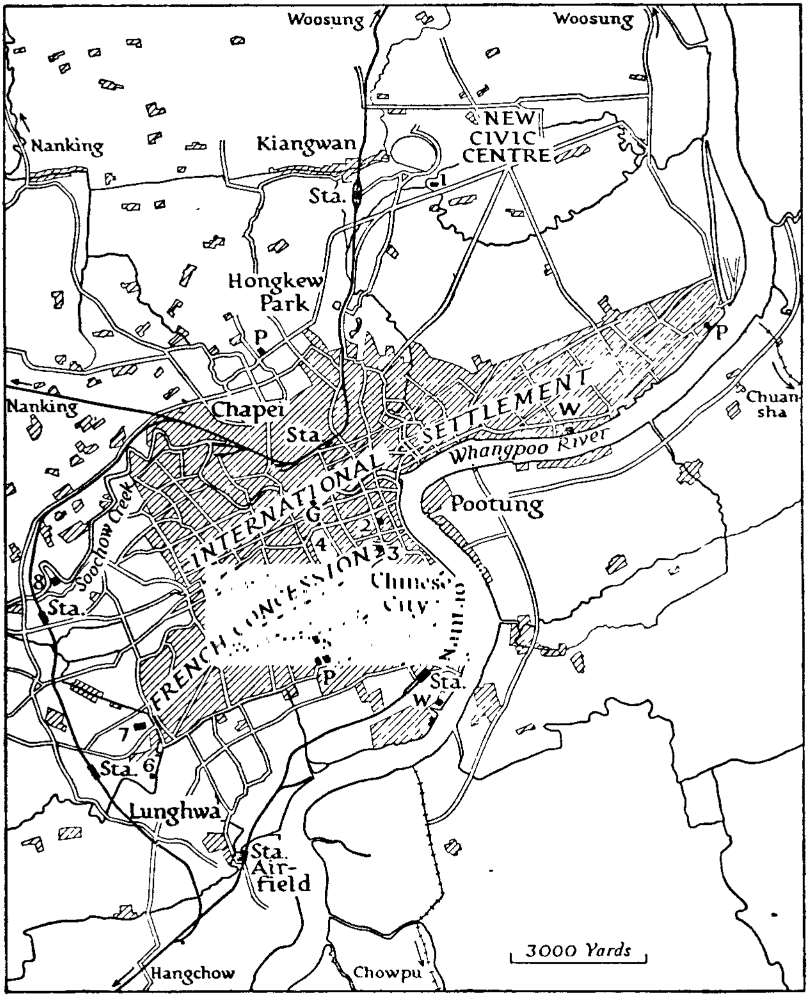


Fig. 62. Shanghai

Based on 1 : 50,000 G.S.G.S., Series 3789, *Eastern China*, sheet 'Shanghai.'
G, Gasworks ; P, Power station ; W, Waterworks.

1. Futan University ; 2. Administration buildings, International Settlement ; 3. Municipal offices, French Concession ; 4. Recreation ground, International Settlement ; 5, Aurora University ; 6. Siccawei observatory ; 7. Nanyang college ; 8. St. John's University.

many parks and recreation grounds of which Hongkew park and the International Settlement Recreation ground are the largest.

Electric light and power in the International Settlement is supplied by the Shanghai Power Co., whose Riverside power station, at the

east end of Yangtzepoo, has a generating capacity of 183,000 kw. The French Concession is served by the *Compagnie Française des Tramways et d'Éclairage Electrique de Shanghai*, whose Diesel power plant, situated at Lokawei, was the largest in the Far East, with a generating capacity of 28,320 kw. The Chinese areas are served by the Chapei Electricity and Waterworks Company, with plants at Chapei and at Hsinkaichiang, and by the Chinese Electric Power Company, whose plant is at Nantao. There are a number of smaller plants mainly attached to industrial concerns. The Shanghai Gas Company, the only organization of its kind in Shanghai, has its works in Yangtzepoo and on Soochow creek.

Water is supplied by four companies serving different areas and all using water from the Whangpoo. The Shanghai Waterworks Company with its plant at Yangtzepoo supplies the International Settlement; the *Usine des Eaux de Ton-Ka-Dou* serves the French Concession from its plant at Nantao, actually outside the Concession. The Chinese-controlled districts are served by the Chapei Electricity and Waterworks Company from the Hsinkaichiang for the north side as far as Woosung, and by the Shanghai Inland Waterworks for Nantao and Lunghwa from a plant at Nantao near the French waterworks. Shallow wells and the river are also used extensively by the Chinese, with considerable danger to public health. Three systems of tramways, operating in the International Settlement, the French Concession, and the Chinese municipality, motor-buses and trolley-buses serve the needs of Shanghai in public passenger transport.

While the Public Health authorities in the foreign quarters maintain high standards of hygiene and health services, the Chinese municipality is not so well served, though improvements have been made. There are seventeen large hospitals administered by municipal and private, mainly mission, bodies. Shanghai is adequately served by police forces and fire-brigades under the control of the various municipal authorities.

Facilities for primary, secondary, and vocational education are also the concern of the three city administrations, while higher education is also well provided for by no less than twenty-five universities and colleges. Of these the most famous are the three National Universities and the private institutions of St. John's University, Aurora University, and the University of Shanghai. At Siccawei, just outside the south-western tip of the French Settlement, is Siccawei observatory, a Jesuit foundation with an international reputation as a meteorological station.

History

Shanghai had a humble beginning as a small fishing village, one of many in the delta of the Yangtze. In early times it was known by various names and to one of these, Hu Tu, a reference is made in the book of the Chin dynasty (third century A.D.). In 1075 it first appears as Shanghai, and in 1292, when it had already established itself as a small trading centre, it was constituted a *hsien*. About this time the Customs station of the district was removed there from Liuho, which was silting up. In 1554 the Ming emperor gave permission for the building of a wall to protect the town from the ravages of Japanese pirates.

By the nineteenth century it had attained considerable commercial importance and created a favourable impression on the first visitors from Europe, Rev. Charles Gutzlaff in 1831, and the crew of the *Lord Amherst* in the following year, who immediately saw its possibilities for trade. In the first war between Great Britain and China, Shanghai was captured by British forces in 1842, and was one of the original five ports opened by the Treaty of Nanking. In 1853 the native city was occupied by the Triad rebels, and the opposing imperialist troops, who threatened the security of the International Settlement, were expelled from their camp by a volunteer force from the Settlement ; this encounter, which took place in 1854, was known as the 'Battle of Muddy Flat.' In 1860 the Taiping rebels captured Soochow and approached Shanghai and the Settlement. The foreign powers took precautionary measures, but the rebels remained in the vicinity and trade suffered as a consequence. In 1862 the Imperial government raised a force of foreign volunteers to deal with the Taiping threat. Under the leadership of Major (afterwards General) Charles Gordon, this motley throng of mercenaries, the 'Ever-victorious Army,' was welded into an efficient military force, defeated the Taipings, recaptured Soochow, and aided materially in the suppression of the rebellion. Shanghai weathered the stormy periods of the Boxer rising, of the Revolution of 1911–12, and of the decade following, with little trouble apart from occasional rioting, thanks largely to the political security it enjoyed by virtue of the control over the largest and most important part of the city by foreign powers, which were not slow to instal garrisons at the hint of trouble. In 1927 the Nationalist armies occupied Shanghai, the municipality was reorganized, and the city began to take a leading part in the struggle for the abrogation of the 'unequal treaties.'

Shanghai's long immunity from a serious conflict came to an end

in 1932. Relations between the Chinese and Japanese in the city were particularly strained after the display of Japanese aggression in Manchuria; these eventually culminated in a series of demands on the Chinese municipality by the Japanese Consul-General in January 1938, and in the outbreak of hostilities between Japanese and Chinese forces. Owing to the determined resistance put up by the Chinese 19th Route Army, the Japanese were unable to drive their opponents from the Shanghai area until March, after which the conflict gradually died down. Though the opening of hostilities in North China on 7 July 1937 had repercussions in Shanghai, fighting did not break out until 13 August. At first the Chinese forces had considerable success, almost driving the Japanese forces into the Whangpoo, but the latter landed strong reinforcements at Shanghai and Woosung and steadily drove the Chinese westward. The surprise landing of further Japanese forces at Hangchow wan on 5 November threatened the rear of the Chinese armies, who were thus compelled to evacuate the Shanghai area, which accordingly passed under Japanese control.

The Chinese Municipality

The beginnings of municipal government of the Chinese territory in Shanghai dating from 1906 were on a very limited scale and undertaken primarily to prevent further expansion of the foreign-controlled area. In 1926 the three separate areas of Chapei, Nantao, and Woosung were combined by the then governor of Kiangsu and the south-eastern provinces. This organization had a short existence, for in 1927 the National Government extended its control to the Shanghai area, which was constituted a special municipality at the end of the same year. Thus created, the Municipality of Greater Shanghai surrounds the International Settlement and the French Concession, and includes Pootung and zone extending as far as the Yangtze on both sides of the Whangpoo. It covers an area of about 320 square miles, much of it rural in character, with a population of 2,089,007 Chinese and 10,125 foreigners in 1935.

The municipal government of Greater Shanghai consists of a mayor, appointed by the National Government, assisted by a secretary-general and the directors of various administrative bureaux, eight in number. There is also a Provisional Municipal Council and a number of committees of experts, appointed by the mayor, and acting in an advisory capacity. The powers of this municipal government are very wide, and it controls police, fire-brigade, health,

education, public works, and utilities. In 1929 a city planning commission was set up, which drew up plans of a far-reaching scheme of development in the Kiangwan area, between the Settlement and Woosung. A beginning was made with the establishment of a new Civic Centre here with administrative building, gardens, parks, and residences. Port and industrial development is planned along the waterfront, and a beginning was made in 1937 with the building of Jukong wharf.

The International Settlement

The International Settlement at Shanghai had its origin in the British Settlement established by the Land Regulations of 1845, after agreement between British and local Chinese officials. The first British consul, who arrived at Shanghai in 1843, selected a small marshy area north of the Chinese city of Shanghai between Yangkingpang and Soochow creeks. The Land Regulations contemplated the complete exclusion of Chinese from the Settlement, and it was intended that land there would be gradually reclaimed and acquired by foreign nationals from its Chinese owners. Non-British foreign nationals were allowed to take up land in the Settlement, but were subject to the Land Regulations as administered by the British consul. Such an arrangement was obviously at variance with the privileges of other powers, notably France and U.S.A., who had acquired treaty rights in China. Accordingly, in 1854, a new code of regulations was promulgated instituting an International Settlement, in which all foreigners had equal rights. The disturbance created by the Taiping rebellion, which led to a great influx of Chinese into the Settlement, and a steady increase in the foreign population, introduced difficulties of administration, and in 1866 a revised code was drawn up. In the meantime the Hongkew–Yangtzepoo area had been set aside as an American Settlement, and was immediately amalgamated with the existing International Settlement under the 1854 regulations. An attempt to incorporate the French Concession failed, and in 1869 the revised code, which remained substantially the same up to the Japanese occupation in 1941, was sanctioned by the Chinese and foreign governments concerned.

The general administration of the Settlement is in the hands of a Municipal Council, which originally consisted of foreign members only. After long agitation three Chinese members took their seats on the Council in 1928, and in 1930 the number was increased to five. The nine foreign members are elected annually by the ratepayers of

the Settlement qualified to vote, while the five Chinese members are chosen by the Chinese Ratepayers' Association and other organizations. Under the Land Regulations, ratepayers are foreigners who own land or are householders above certain limits of value. The ratepayers qualified to vote, who in 1935 numbered 3,852 out of a total foreign population of 28,583, also meet annually to approve accounts, to pass estimates, and to give authority to the Municipal Council to levy rates and taxes. Special meetings may be held for making or amending bye-laws or for deciding on important matters, but have rarely taken place. In 1937 the Council consisted of 5 British, 2 American (one of whom was chairman), 2 Japanese, and 5 Chinese members.

The Settlement is administered according to the Land Regulations of 1866 and additional bye-laws. The specific powers set out in the Regulations are few, but a phrase in Article IX, 'better order and good government of the Settlement,' is held to cover anything for which funds are voted. The executive power lies in the hands of the chairman, the secretary, and the secretary-general, who is chiefly concerned with political matters. There are twelve committees acting in an advisory capacity, and ten administrative departments, staffed by foreign nationals, mainly British in character, with English as the official language. The ordinary revenue of the Council is derived from the Land Tax, the General Municipal Rate, licence fees, and income from public and municipal undertakings ; the chief items of expenditure are police, public works, education, and public health.

Most of the foreign nationals in the Settlement are entitled to extraterritorial rights, and are subject to the judicial authority of their consular courts. Chinese residents of the International Settlement were from the earliest days triable by a Mixed Court, administering the laws of China, Chinese judges sitting with foreign assessors in criminal cases or in civil cases in which foreigners were involved. On the outbreak of the Revolution of 1911, the Chinese judges were appointed by the Consular Body, which in effect controlled the Court. In 1930, this control was surrendered and a Chinese Provisional Court set up, which was later reorganized into a district court and branch high court as integral parts of the Chinese judicial system. The exercise of direct jurisdiction by the Chinese authorities within the settlement was always contested by the Settlement Authorities, and was frequently the cause of bad relations between them and the Chinese authorities.

Plate 77. The Whangpoo river
A cargo vessel moored in midstream discharging into lighters.

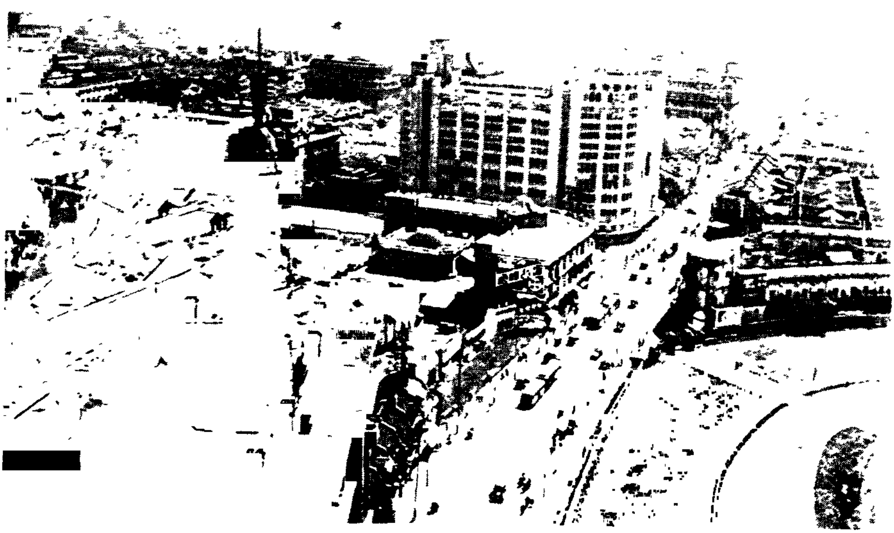


Plate 78. Bubbling Well road, Shanghai
A view in the International Settlement, with part of the race track visible in the bottom right-hand corner.

Plate 79. The bund, Shanghai

Plate 80. Siccawei creek, Shanghai

Siccawei creek is an important waterway in the Shanghai area and carries much barge and sampan traffic.

For the purposes of security the Municipal Council maintains a municipal police force, which in 1937 consisted of 4,223 Chinese, 561 Sikhs, 267 Japanese, and 471 other foreign nationals, and the Shanghai Volunteer Corps. The Volunteer Corps is organized in companies on a national basis, and had a special Russian detachment, a paid professional unit of about 300 men, which is used to supplement the police force in emergencies.

While the Settlement was entitled to maintain an armed neutrality in China's wars, it was equally understood that any of the Settlement powers should not use the Settlement as a base of military operations against China. Great Britain, U.S.A., France, Italy, and Japan maintained foreign garrisons at Shanghai, but only, excepting Japan, to protect their nationals ; the British garrison was finally withdrawn in August 1940.

After the Manchurian incident of 1932 the relations between the Chinese and Japanese at Shanghai, as elsewhere in China, grew steadily worse, especially since the Japanese had used the International Settlement as a base for military operation against Chinese territory. Japanese interests in the Settlement since the war of 1914–18 had steadily expanded, and the increasing importance of the Japanese community was reflected in the appointment of two Japanese to the Municipal Council, and of a number of Japanese to the advisory committees and in the growth of the Japanese section of the municipal police. From 1932 to 1937 a three-cornered struggle went on at the Settlement, the Japanese opposing every Chinese effort to secure new privileges at the expense of foreign rights, and both endeavouring to reduce the Anglo-American predominance in the International Settlement. The normally smooth functioning of the Settlement was thus seriously hampered by the Japanese effort to secure a larger share in municipal administration and control. In 1938 the Japanese authorities in Shanghai made a series of far-reaching demands on the Municipal Council on the grounds of inefficiency in suppressing anti-Japanese activities. The council met the Japanese requests on some points only, especially with regard to increased participation in the police force. The Japanese continued to exert pressure on the Municipal Council up to 1941 as part of their policy to foster agitation against Great Britain and U.S.A., and at the outbreak of the Pacific war occupied the whole International Settlement, forcing the resignation of the British and American members of the Council and its administration. By the treaties of 11 January 1943, the British and United States governments

agreed that the International Settlement at Shanghai (and also at Kulangsu, Amoy) should revert to the administration and control of the government of the Republic of China, and that steps should be taken in co-operation to effect such transfer.

The following table illustrates the growth of the International Settlement since 1846:

	acres
Original British Settlement, 1846	138
Additions, 1848	332
'American Settlement,' incorporated 1863 ..	1,309
Extensions, 1899	3,804
Total ..	5,583

The municipal census of 1935 showed the population of the International Settlement to be 1,120,860 Chinese and 28,583 foreigners. The steady growth of population has been in step with industrial and commercial development, as the following statistics show:

Year	Population	Year	Population
1865	92,884	1905	464,213
1870	76,713	1910	501,541
1876	97,335	1915	638,920
1880	110,009	1920	783,146
1885	129,338	1925	840,226
1890	171,950	1930	1,007,868
1895	245,679	1935	1,149,443
1900	352,050		

The External Roads Areas

From the closing years of the Taiping rebellion, when the International Settlement was crowded with refugees, the Municipal Council has constructed roads and public works and established parks and recreation grounds outside the limits of the Settlements, as provided for in Article VI of the Land Regulations of 1869. There are two areas in which these extra-Settlement roads have been built and in which much of the land is owned by foreigners. One lies to the west of the Settlement and is 7,640 acres in extent, the other, north of the Settlement, is much smaller, only 283 acres in extent. In 1937 there were 48,093 miles of external roads in the western section and 5,088 miles in the northern section. The opposition of the Chinese authorities has prevented further extension of the External Roads Areas as it had further extension of the Settlement.

Suburban development in these areas naturally raised the question

of administrative control, which became more acute after the establishment of the Municipality of Greater Shanghai in 1927. The cost of policing of the roads for the purposes of protection and traffic control was first met by voluntary subscriptions and later by a special rate. Public utility companies also functioned in the external roads area.

After 1937 the Chinese municipality claimed the administration of these extra-Settlement areas and established their own police stations there. A further difficulty was the competition between the Settlement and Chinese public utility companies. As the question was one of vital importance for the Settlement, which not only was anxious to relieve overcrowding in the Settlement by individual residential development outside its limits, but also had large interests there, several attempts were made from 1930 on to reach a compromise with the Chinese authorities. Such a compromise seemed to be in sight in 1937, but the question was shelved on the outbreak of hostilities and will naturally not arise when the war is over and the whole Shanghai area comes under Chinese control.

The French Concession

In 1849 a site between the British Settlement and the old Chinese city was set aside as a French Settlement. The site remained derelict until the French authorities agreed that the 1854 Land Regulations should also apply to the French area, and the land was then taken up by various foreign nationals, mostly British and French. In practice, however, the council elected by the Regulations of 1854 was not allowed by the French consul to function in the French Concession and the French government refused in 1866 to amalgamate the two areas. The French consul promulgated a *Réglement d'organization municipale de la Concession française de Changhai.* In 1866, this, as revised in 1868, provided that the *Conseil d'Administration* of the French Concession was to consist of the French Consul-General (*ex officio* chairman) and of at least fourteen municipal councillors, chosen as follows :

(*a*) Four French councillors, elected by French electors.

(*b*) Four foreign councillors, belonging to at least three different nationalities, elected by foreign electors.

(*c*) Three Chinese councillors and } nominated by the Consul-
(*d*) Three French councillors. } General.

Power is also given to the Consul-General to nominate, subject to the approval of the French Ambassador, additional Chinese or foreign councillors, provided that he also nominates an equal number of French councillors. The provision for Chinese representatives remained inoperative until 1914 when two were appointed, and in 1927 provision was made for three. There also have been seven advisory council committees, administrative departments, of which Public Works, Police, and the Secretariat are the more important, a secretary and, since 1927, a secretary-general. The provisions of the *Réglement*, however, reserve the real power of government to the Consul-General, and the *Conseil d'Administration* is only an advisory body, unlike the Municipal Council of the International Settlement. Its decisions are not effective until signed by the Consul-General, who also has a power of veto, which is final on the approval of the French Ambassador. Over financial and administrative matters, and especially for the police, the control of the Consul-General is paramount. Amendments have been promulgated from time to time by *Ordonnance Consulaire* without reference to the interest concerned, one of which, in 1915, provided for an indefinite period of suspension of the *Conseil d'Administration* in time of war. In 1926 this was extended to cover civil war, and since that date only a *Commission Provisoire* has existed, appointed by the consul similar in composition to the *Conseil d'Administration* and including five Chinese representatives. Political developments in the International Settlement up to 1937 have had their counterpart in the French Concession, but the absolute control exercised by the French authorities has enabled the Concession to escape much of the agitation over these matters in the International Settlement. After the Japanese occupation of Shanghai also, the French Concession was better able to maintain its integrity, though after December 1941 the French administration was no doubt subject to some degree of Japanese supervision, and in March 1945 the Japanese disarmed the French troops there and took over the administration of the Concession.

The following table illustrates the growth of the French Concession since its inception :

	acres
Original Concession	164
Extension, 1861	23
Extension, 1900	171
Extension, 1914	2,167
Total area ..	2,525

The estimated population of the French Concession in 1935 was 479,294 Chinese and 18,899 foreigners. The growth of the Concession population, which has been rapid since 1920, is shown by the following figures:

Year	Population
1895	52,188
1900	92,263
1905	96,963
1910	115,946
1915	149,000
1920	170,229
1925	297,072
1930	434,807
1935	498,193

Industry

Before the coming of the foreigner, Shanghai was a leading centre of the traditional Chinese industries. Of these the spinning and weaving of cotton were the most important and Shanghai nankeens were said to be the best in China. Although the principal article of European manufacture to enter Shanghai in the early days was cotton cloth, and a large modern cotton industry has developed, cotton spinning and weaving still persists as a home industry.

Early industrial enterprises included the Kiangnan Arsenal and Dockyard (1865), the first silk filature (1880), and the first cotton mill (1890). Other industries followed, but it was not until the Treaty of Shimonseki (1895) gave all foreigners the right to establish manufacturing industries in China, that Shanghai experienced its first industrial boom. A second boom came during and after the war of 1914–18, when the Western powers found difficulty in maintaining their exports. By 1937 Shanghai was probably as important in manufacturing industry as all the rest of China Proper. Industrial statistics for China have never been as complete as could be wished, but in 1934 Shanghai possessed 55 per cent. of the total spindles and 57 per cent. of the looms in all China, and had 47 per cent. of the total producing capacity of flour; in other industries she occupied just as high a place (see p. 124).

The rapid development of industry in Shanghai is shown to some extent by the increase in electricity sold by the Shanghai Power Co. from a total of 569,000 kWh. in 1901 to 743,510,000 kWh. in 1934. This company supplies about 83 per cent. of the electricity sold in Greater Shanghai, of which about three-quarters was consumed for industrial purposes. The sales of electricity by the company to specific industries serves as an index of the relative

importance of the various industries in the absence of more accurate information :

Sales of Electricity by the Shanghai Power Co. to Specific Industries, 1930–34 *(thousands of kilowatt-hours)*

Industry	Average annual sales	Percentage of total sales
Cotton mills	397,344	77·8
Flour mills	37,561	7·3
Miscellaneous textiles ..	6,542	1·28
Rubber works	5,681 (1931–34)	1·3
Egg products factories ..	4,313	0·84
Electro-chemical works ..	4,244	0·83
Ice companies	3,974	0·78
Paper mills	3,887	0·76
Silk mills	3,336	0·66
Tobacco factories	2,824	0·55
Lumber mills	2,541	0·5
Metal works	2,505	0·49
Oil mills	1,861	0·4
Total industrial power ..	511,233	

Source : Orchard, J. E., ' Shanghai,' *Geographical Review,* vol. xxvi, p. 26 (New York, 1936).

The dominant position of the textile industry is further illustrated by the first table on p. 321, the result of a survey in 1934–35 by the Shanghai Municipal Council of the factories and workshops in the International Settlement.

In the same year the Bureau of Social Affairs of the Chinese Municipality of Greater Shanghai issued similar statistics for its administrative area as shown in the second table on p. 321.

These statistics also give some idea of the wide range of industrial development in Shanghai.

The most important industrial area of Shanghai is the Yangtzepoo district of the International Settlement on the north bank of the river below Soochow creek, where numerous cotton mills, together with engineering and chemical works, are located. Second in importance is the district along both banks of Soochow creek, partly in the International Settlement and partly in the Chinese suburb of Chapei; there also has been an expansion north-eastwards towards the suburbs of Paoshan and Hongkew. Most of the industrial

Factories and Workshops in the International Settlement, Shanghai, 1935

Classification	No. of workers	No. of factories
Textiles	75,242	567
Food, drink, tobacco	25,886	155
Machinery and metal products	19,051	1,108
Paper, bookbinding, printing, photography	17,730	663
Clothing industries	13,765	226
Chemicals and allied products	4,225	191
Metal industry	2,602	167
Woodworking	2,010	98
Bricks, earthenware, glass	1,637	45
Vehicles	1,292	20
Leather, skin, and rubber	1,039	36
Furniture manufacture	912	23
Scientific and musical instruments, precious metals and stones	640	22
Water, gas, electricity	362	5
Other manufacturing industries	4,311	95
Total ..	170,704	3,421

Source: Jones, F. C., *Shanghai and Tientsin*, p. 74 (London, 1940).

Factories and Workshops in the Municipality of Greater Shanghai, 1935

Classification	No. of workers	No. of factories
Vehicles	73,448	46
Textiles	50,472	690
Foodstuffs and beverages	32,379	84
Wearing apparel	16,826	344
Machinery and metal ware	16,708	720
Rubber	11,845	78
Chemicals	7,426	121
Power generating	5,267	8
Timber	4,101	25
Brick, tile, cement, glass	3,370	61
Foundry and ironworks	3,224	169
Architectural, engineering, and building materials	1,796	31
Scientific apparatus and jewellery	1,779	72
Others	17,023	227
Total ..	245,664	2,676

Source: Jones, F. C., *Shanghai and Tientsin*, p. 75 (London, 1940).

establishments here are small and under Chinese management. Further west along the upper reaches of Soochow creek is a third industrial area with large textile, flour, and oil mills and chemical works. There has been little industrial development in the original International Settlement, in the French Concession, and in the old Chinese city, but in Nantao and nearby areas north of the Whangpoo there is another clustering of small Chinese factories, mainly machine shops. At Pootung, on the right bank of the Whangpoo, is a further concentration of large-scale enterprises, cotton mills, paper and tobacco factories, engineering works and oil installations (Plate 46). The general distribution of factories is shown in Fig. 33, and the following table indicates the location of specific industries :

Number and Location of Factories, Shanghai, 1928

	Classification				
Location	Machinery and tools	Spinning and weaving	Foods	Chemicals	Others
Western area of external roads	9	23	15	7	8
Chapei, Paoshan, and Hongkew	36	91	18	55	47
International Settlement, western part	7	35	17	15	33
International Settlement, Yangtzepoo	101	43	37	19	68
French Concession ..	7	21	24	13	14
Chinese city and Nantao	46	44	20	57	41
Pootung	10	14	4	7	1

Source: Orchard, J. E., 'Shanghai,' *Geographical Review*, vol. xxvi, p. 29 (New York, 1936).

The hostilities at Shanghai in 1932 and again in 1937 did immense damage to the industries of Shanghai. Whereas in 1932 the damage though considerable was confined mainly to the Chapei area and was rapidly made good, in 1937 it ranged from Yangtzepoo to Nantao, and the consequent industrial loss has been estimated at not less than £20,000,000. The brunt of this fell on Chinese-owned concerns, but foreign establishments were also heavily hit. The most notable result of this destruction has been a large-scale transference of industry to the western area of the International Settlement, an

area not previously regarded as being primarily industrial, and to some extent to the French Concession.

The industrial development of the Shanghai area has been largely financed by foreign powers. Dr C. F. Remer has estimated the investments of the leading foreign powers at Shanghai in 1931 to be as follows :[1]

	£ (millions)
Great Britain	130
Japan	44
U.S.A.	20
France	8

These include not only industrial, transportation and business investments but also investments in banking and insurance. The development of the city was accompanied by the establishment there of branches of numerous foreign banks ; these amounted to twenty-seven in December 1937, and included the Hong Kong and Shanghai Banking Corporation, the *Deutsche-Asiatische Bank*, the Yokohama Specie Bank, and the National City Bank of New York. Foreign banks long had a monopoly of the finance of foreign trade and were active in advancing loans to the Chinese government and in securing mining, railway, and other concessions (see p. 558 *et seq.*). The growth of a modern Chinese banking system since 1928 has reduced the influence of foreign banks, but has not detracted from the importance of Shanghai, where many Chinese banks have their head offices. Large stocks of silver were maintained at Shanghai up to the unprecedented rise in silver exports after 1935 and served as a reserve against bank-notes issued. Shanghai bank-notes were accepted widely in China and served almost as a national currency until the currency reforms of 1935 (see p. 203).

Trade

The development of Shanghai as a trading centre was extraordinarily rapid after its opening in 1842. In that year Canton still enjoyed a virtual monopoly of China's foreign trade, and seems to have still held the lead in 1851, but by 1871 Shanghai's share of the purely external trade was 63 per cent., while Canton's had declined to 13 per cent. The eclipse of Canton was due partly to Shanghai's better geographical location, but largely because Shanghai was free from the restrictive influences of the Chinese guilds, which had monopolized foreign trade for so long at Canton (see p. 262). Since then Shanghai has never been challenged as a trading centre,

[1] Remer, C. F., *Foreign Investments in China* (New York, 1933).

handling annually over half of China's foreign trade and nearly 40 per cent. of the domestic trade.

Comparative percentages of the total value of direct foreign trade of some of the leading ports illustrate Shanghai's predominance : [1]

Port	1933	1934	1935	1936
Shanghai ..	53·37	55·42	53·08	55·56
Tientsin	10·62	11·29	11·75	11·53
Tsingtao	5·70	5·32	6·55	6·44
Canton	6·11	5·14	4·91	4·44
Swatow	..	..	3·04	3·20
Hankow	2·13	2·67	3·05	2·81

As a contributor to the Maritime Customs' revenue Shanghai has been by far the most important of all Chinese ports, as the following comparative percentages of Maritime Customs' revenue show:

Port	1933	1934	1935	1936
Shanghai ..	51·90	52·40	47·26	45·86
Tientsin	12·42	12·30	13·02	10·94
Tsingtao	6·65	6·02	7·07	6·26
Hankow	6·01	5·79	7·10	7·05

Figures of the comparative percentages of the total Chinese shipping traffic also indicate the leading position of Shanghai as a port:

Port	1933	1934	1935	1936
Shanghai ..	25·64	25·27	23·63	21·94
Canton	5·17	6·23	6·48	5·75
Hankow	4·87	4·98	5·19	5·59
Tsingtao	4·77	4·94	5·02	5·20
Tientsin	4·49	4·27	4·03	3·56

More detailed statistics of the percentages for 1936 show that in foreign trade Shanghai far exceeds her rivals, but in domestic trade is approached more closely by the Lower Yangtze ports :

[1] This and following tables are based on figures in the Maritime Customs' *The Trade of China* (annually, Shanghai).

Port	Foreign trade	Domestic trade	Total
Shanghai ..	35·83	15·64	21·94
Nanking.. ..	0·54	10·67	7·51
Wuhu	1·16	10·27	7·43
Kiukiang ..	0·09	9·54	6·59
Canton	12·28	2·79	5·75
Chinkiang ..	0·22	8·15	5·68
Hankow ..	1·86	7·28	5·59
Tsingtao ..	7·39	4·10	5·20
Swatow	8·83	2·64	4·57
Tientsin ..	4·54	3·12	3·56
Amoy	4·97	2·75	3·44
Chefoo	1·80	3·43	2·92

In 1935 the total tonnage entered at the twelve leading ports of the world was :

New York	34,986,220
London	29,673,932
Kobe	28,334,334
Rotterdam	20,933,244
Osaka	20,169,165
Shanghai	19,846,017 [1]
Hong Kong	19,613,588
Hamburg	18,214,977
Antwerp	18,068,910
Philadelphia	17,841,304
San Francisco	17,415,334
Liverpool	16,636,626

The total tonnage entered and cleared at Shanghai in 1936 was 31,810,259, of which slightly less than half was in domestic trade. The preponderance of British shipping at Shanghai, as in China as a whole, is shown by the following table covering the period 1932–37 :

Tonnage of Shipping by Flags, Shanghai
(million of gross tons)

Flag	1932	1933	1934	1935	1936
British ..	12·9	13·0	12·4	12·5	11·2
Chinese ..	6·3	6·7	7·6	6·3	5·4
Japanese ..	5·5	5·9	5·8	5·8	6·3
American ..	3·2	3·5	..	3·2	2·7
Norwegian ..	2·1	2·0	..	1·6	1·5

[1] Including 2,428,477 steamer tonnage entered from inland places, but excluding upward of 60,000 junks.

Over twenty of the world's most famous shipping companies operate regular passenger and cargo service to Shanghai, from Europe and across the Pacific; among these are P. & O. Co., Canadian Pacific Railway Co., *Lloyd Triestino*, *Norddeutscher Lloyd*, *Hamburg-Amerika Linie*, *Messageries Maritimes*, *Java–China–Japan Lijn*, American Mail Lines, and *Nippon Yusen Kaisha.*

In 1936 the total value of trade at Shanghai was $1,816·2 million, made up as follows:

	Imports	Exports	Total
Foreign trade ..	555·2	362·3	917·5
Domestic trade ..	436·0	462·7	898·7

Leading imports include metals and ores, machinery and tools, vehicles, miscellaneous metal manufactures, wool and woollen manufactures, flax, ramie, jute, and their manufactures, raw cotton and cotton piece-goods, mineral oils (mainly kerosine), chemicals, dyes, and paints, tobacco, books, maps, paper, and wood pulp, timber, cereals, animal products, canned goods and groceries. The more important exports were vegetable oils, mainly wood-oil, animals and animal products, chiefly eggs and egg products, hides, leather and skins, cereals and cereal products, textile fibres and manufactures, ores and metals, tea, beans, and seeds.

The four most important countries trading with Shanghai are U.S.A., Japan, Germany, and Great Britain; comparative percentages for 1936 were as follows:

Country	Imports	Exports	Total
U.S.A.	24·31	33·00	28
Japan	13·25	11·94	12·5
Germany	19·34	6·10	13
Great Britain ..	12·25	10·34	11

Netherlands East Indies also played an important part in the import trade, while a considerable amount of goods were exported to France and Hong Kong.

During the first seven months of 1937 the foreign trade of Shanghai

increased by 47·5 per cent. as compared with the corresponding period of 1936, a phenomenon common to all Chinese ports; but the outbreak of war had disastrous effects, especially on Shanghai, where trade in the last five months of the year declined by 56·7 per cent. as compared with 1936. During 1938 Shanghai continued to suffer far more severely than the rest of China as hostilities raged over the Yangtze valley; trade was diverted to Tientsin and other ports and the value of foreign trade fell by over £30,000,000. The following table of the value of trade of the chief trading nations during the period 1936–38 illustrated the severity of Shanghai's trade losses:

Foreign Trade, Shanghai, with U.S.A., Japan, Germany, and Great Britain, 1936–38 (*millions of pounds sterling*)

	1936	1937	1938
U.S.A.			
Imports	8·1	6·9	3·4
Exports	7·2	8·6	1·4
Total	15·3	15·5	4·8
Japan			
Imports	4·5	4·5	2·2
Exports	2·6	1·9	0·5
Total	7·1	6·4	2·7
Germany			
Imports	6·3	4·9	2·0
Exports	1·3	2·2	0·9
Total	7·6	7·1	2·9
Great Britain			
Imports	4·1	4·0	1·7
Exports	2·2	2·8	1.1
Total	6·3	6·8	2·8

Source: Jones, F. C., *Shanghai and Tientsin*, pp. 83, 96 (London, 1940).

The tonnage of foreign shipping using the port fell from 15·6 million tons in 1936 to 11·3 million tons in 1937 and to 10·2 million tons in 1938.

From 1939 to the outbreak of the Pacific war in 1941 the position showed a remarkable improvement with the spread of hostilities

to other areas, and Shanghai regained its former very large share in China's foreign trade as the following table of comparative percentages shows:

	1937	1938	1939	1940	1941 (Jan.-Sept.)
Shanghai	51·0	30·1	49·9	53·0	51·8
Tientsin	11·9	24·7	18·6	20·2	18·0
Tsingtao	6·0	4·7	7·5	8·0	6·7
Canton	6·1	9·9	0·4	0·7	1·9
Swatow	3·9	4·5	2·9	0·0	..
Hankow	2·4	0·2	0·0	..	..
Kowloon	5·5	10·5	0·6	3·0	2·4
Chinwangtao ..	0·8	3·2	4·6	3·0	2·8
Luichow	0·2	0·6	1·4	3·8	8·1
Southern Frontier Ports [1]	2·8	3·6	6·6	2·8	6·0

The apparent increase in the value of the foreign trade of Shanghai ($2,246·1 million, January–September 1941) was largely due to fall in the value of the Chinese dollar, but trade with Japan naturally grew, while imports from other Asiatic and Pacific countries showed large increases.

Communications

The creeks and canals in the Yangtze delta around Shanghai are estimated to be 25,000 miles in length, and accordingly inland waterways have played in the past a much more important part in feeding Shanghai than either roads or railways, but improvements in road and railway transport, which may be expected in the future, are likely to deal a heavy blow to water traffic. As a result of continued neglect the great majority of these creeks and canals are navigable only to small vessels of 4 to 5 ft. draught or even less in the dry season. There are regular launch and passenger-boat services to Changshu, Pinghu, Hangchow, Soochow, Huchow, Tsingpu, Sinchang, and Changyen, mainly by Soochow creek and the Whangpoo river; in the harbour area there are numerous public and private ferry services plying to all parts of the Whangpoo.

The first railway line in the Shanghai area was a light railway from Shanghai to Woosung, which was opened in 1876, but closed down at the end of the same year, and dismantled in 1877. The line was rebuilt in 1898 and now forms part of the single-track standard-

[1] Lungchow, Mengtsz, Szemao, and Tengyueh.

gauge Shanghai–Nanking railway, which was opened to traffic in 1908. In normal times a through-express to Peiping was in operation daily. The Shanghai terminus is the Shanghai North railway station in Chapei, which was completely destroyed in 1937. The line to Woosung has been extended by the Japanese some distance north, and a gasoline rail-car service has been reported to operate along it.

From Shanghai South railway station in Nantao, runs the Shanghai–Hangchow–Ningpo single-track standard-gauge line, which links up with the Chekiang–Kiangsi line at Hangchow, and thus gives rail connexion with Hankow and Canton by a circuitous route. A loop line encircling Shanghai on the western side links the two railway systems. There are narrow-gauge light railways running from two points on the right bank of the Whangpoo eastwards to Chuansha and Chowpu.

There is an extensive road network of macadamized roads in the International Settlement, the French Concession, and the External Roads Areas. The roads in Pootung and those leading to the new civic centre at Kiangwan are also macadamized, but the majority of the Chinese urban roads are of the earth type. The two most important roads from the city are those to Nanking via Wusih and to Hangchow via Chapu; much of these roads was unsurfaced and in poor condition, especially after rain. Earth roads run to Woosung, Liuho, Soochow, Tsingpu, Kashing via Singkiang, Nanhui, and Kaochiao.

Up to 1937 there were four air services operating from the civil airfield and seaplane station at Lunghwa, to the south-west of the city. The C.N.A.C. services, three in number, were to Chêngtu, to Peiping, and to Canton, while the only E.A.C. service was to Lanchow.

The Ministry of Communications operated in 1937 two large W/T stations at Shanghai for international radio-telegraphy. One was situated at Chenju, with 14 call signs, which communicate with San Francisco, London, Paris, Moscow, Berlin, Geneva, Rome, and other European stations; the other at Fengtinchiao, with 6 call signs, communicating with Hong Kong, Tokyo, Saigon, Manila, and stations in Asia. There were a series of small stations (17 call signs in 1935) for communication with other stations in China, while many of the foreign authorities maintain stations for their own use. In 1935 there were 41 broadcasting stations operating in Shanghai, nearly all Chinese-owned. They operated on various frequencies

from 560 to 1,480 k/c, and the largest had a power of only one kw. The Chinese-owned stations were controlled after 1937 by the Japanese authorities, who were reported to be constructing two new stations.

Shanghai normally has telegraph communication with all China and long-distance telephone links with many cities. The following details illustrate the importance of Shanghai as a telegraph cable centre, connected to all parts of the world :

Cable	Nationality	Ownership
Shanghai-Taku (via Chefoo, 2 cables)	Chinese	Ministry of Communications.
Shanghai-Nagasaki	Japanese	Japanese Government.
Shanghai-Hong Kong (via Foochow)	British	Eastern Extension, Australia and China Telegraph Co.
Shanghai-Hong Kong (via Amoy	Danish	Great Northern Telegraph Co.
Shanghai-Manila	American	Commercial Pacific Cable Co.
Shanghai-Nagasaki (2 cables)	Danish	Great Northern Telegraph Co.

The Shanghai Telephone Co., which had 85,681 telephones in 1940, serves the needs of the International Settlement and the French Concession. Telephones in the Chinese Municipality numbered nearly 6,000 in 1936, and were controlled by the Ministry of Communications.

CHINKIANG

Lat. 32° 12′ N., long. 119° 27′ E. Population (1937), 216,803
Chinese Admiralty chart 147 Fig. 58. Plates 81, 131

Chinkiang, the provincial capital of Kiangsu, is situated on the right bank of the Yangtze, 156 miles up river from Woosung. As a commercial centre it derives its importance from its position at the junction of the Yangtze and the Grand Canal, and at the head of the Yangtze delta, but has suffered considerably from the competition of Shanghai, the modern reorientation of trade routes, and the silting up of its harbour.

Approach and Access

Chinkiang itself can be reached at high river by vessels of 30 ft. draught, and at low river by vessels of 20 ft. draught. The least depth in the river up to Chinkiang is usually found in Ta sha

north channel and in the Silver island channels just below the port. Normally, vessels which can reach Woosung can also safely use the main channel of the river which runs along the north bank of the river opposite Chinkiang.

The average difference between high and low river at Chinkiang is 12 ft. The seasonal change of river level is thus more significant than the rise and fall of the tide, which is $3\frac{1}{2}$ ft. at springs and $2\frac{3}{4}$ ft. at neaps during winter, and not more than $1\frac{1}{2}$ ft. during summer. The flow of the river downstream, which is accelerated by freshets, varies from $1\frac{1}{2}$–2 knots at low river, to 2–3 knots at high river; occasionally in winter there is slight flow upstream with the incoming tide.

An important factor in the decline of Chinkiang as a port has been the prevalence of silting, accompanied by a decrease in the depth of water available for shipping. The main stream of the river runs along the left bank, which is steadily receding. Accordingly, on the right or Chinkiang bank there is considerable accretion; the Cheng-jenchow spit is steadily advancing downstream from the west and is blocking the approaches, while other spits are forming off Kanlussu (Consular bluff) and Hsiang shan bluff.

Detailed Description

The flat sandy bottom does not provide good holding ground, especially during autumn gales. This, combined with the unstable state of the river, renders it necessary to obtain the latest information before anchoring at the port.

There are no mooring buoys and vessels berth at hulks, pontoons, or temporary piers, as is usual in the Yangtze river ports, where there are pronounced seasonal differences in level. Butterfield and Swire, Jardine, Matheson and Co., and the San Peh S.N. Co. have hulks in the harbour; the China Merchants' S.N. Co. and Nissin Kisen Kaisha have hulks moored off the bund with wooden piers connecting them to the shore. The Ho Shing Coal Co. have a small pontoon for coaling, while the A.P.C. and S.O.C.O.N.Y. have pontoons near their properties for berthing oil tankers; the A.P.C. pontoon is 240 ft. long and has a depth of 39 ft. alongside at high river and of 25 ft. at low river. There are a number of smaller pontoons for berthing launches.

Port Facilities

There are ample stocks of coal for bunkering stored in open yards along the bund; bunkering is either from lighters or from the Ho

Shing Coal Co.'s pontoon. The A.P.C. had storage for 6,600 tons of kerosine, 1,050 tons Solar oil, and 500 tons Diesel oil in 7 tanks; S.O.C.O.N.Y. has storage for 11,000 tons of kerosine and 4,500 tons of Diesel oil, also in 7 tanks. Both companies have pipe lines laid to their pontoons and adequate supplies are always available. Fresh provisions and general ships' stores can always be had, and small supplies of fresh water are supplied by a local merchant. Most of the companies using the port have well-equipped godowns offering adequate storage facilities.

There are no salvage facilities, but the A.P.C. and S.O.C.O.N.Y. have workshops at their installation capable of handling all branches of engine repairs. There are numbers of steam and motor launches owned by various companies, and also coal lighters and water boats. The A.P.C. has a motor sampan, a motor houseboat, and five bulk lighters for kerosine or oil fuel, and S.O.C.O.N.Y. has a motor tug, *Mei Kong*, a motor sampan, and six bulk lighters.

The Town

Chinkiang is a walled city dating from the Yuan dynasty, built on the level ground between the Yangtze and the Grand Canal, and backed by low hills on the south-east and west. The old double walls, which were about 4 miles in circuit, have been largely demolished, and the city is being gradually modernized by the construction of modern buildings.

Chinkiang was opened to foreign trade in 1861 according to the provisions of the Treaty of Tientsin between Great Britain and China. An area along the river bank to the north-west of the city was handed over as a British Concession, but was retroceded to China in 1929. This former concession, which was largely destroyed in the 1937 hostilities, and the suburbs which have grown up between it and the walled city comprises the commercial centre of Chinkiang.

The city is efficiently lit by electric light supplied by the Ta Chiao Electric Co., whose plant is situated near the A.P.C. installation; S.O.C.O.N.Y. has its own plant. The waterworks, which utilizes water pumped from the Yangtze, formerly supplied the British Concession only and is inadequate for the needs of the whole city. There is no modern sanitation system. Conditions of health are similar to those of other Yangtze ports; there are three hospitals, none of large size. There are local fire-brigades maintained by voluntary contributions. There has been little industrial develop-

Plate 81. Chinkiang harbour
The eastern part of the harbour with Chengjenchow spit in the middle background.

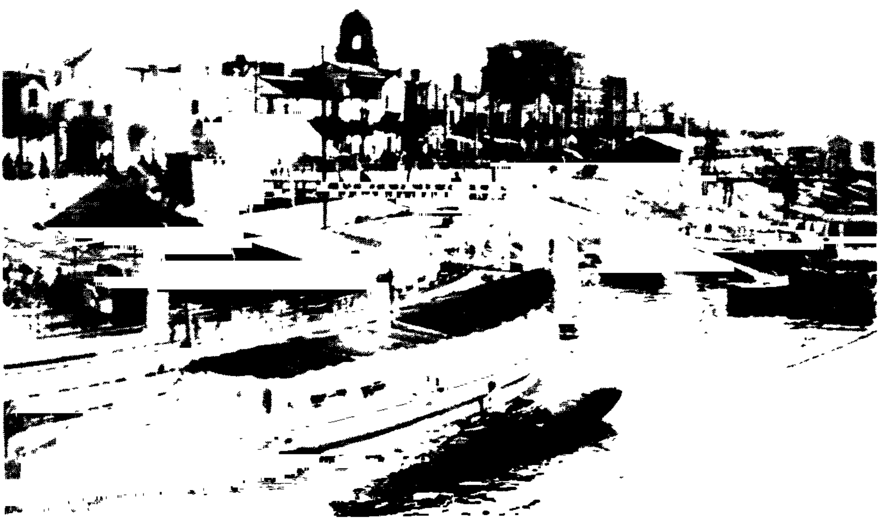


Plate 82. Waterfront, Nanking
A river steamer at a pontoon at Hsiakwan.

Plate 83. Changshan road and Chinhuai creek, Nanking
The new Changshan road crossing Chinhuai creek, looking eastwards from Hsiakwan. The S.O.C.O.N.Y. installation borders the creek on the extreme right.

Plate 84. Waterfront, Wuhu
Lighters discharging cargo and river steamers moored to pontoons.

ment in Chinkiang; the most important establishments are rice mills, breweries, a flour mill, a match factory, and a small foundry.

Trade

In 1936 a total of 8,231,699 tons of shipping entered and cleared at Chinkiang, of which all but a small fraction was in domestic trade; the port ranked sixth in China for domestic shipping. The total value of the trade of Chinkiang in 1936 was $200 million, of which nearly $13 million was domestic trade; the foreign trade was almost entirely exports. Chinkiang is so well served by other means of transport that the statistics issued give an incomplete picture of its trade; as a port it has been losing ground for a number of years. Imports include mineral oils, sugar, cotton, and other manufactured goods; exports, almost entirely coastwise, include wheat, coal, bean oil and bean cake. Foreign trade is mainly with Great Britain, Japan, U.S.A. and N.E.I. After the occupation of the port by the Japanese in late 1937 no further statistics of the trade of Chinkiang were issued.

Communications

The main water routes from Chinkiang run along the Yangtze and the Grand Canal. Along the Yangtze there are regular steamer services to all the ports between Shanghai and Hankow; launches run to Nanking, Kiangyin, and numerous points, both on the Yangtze and the Grand Canal. The latter, which enters the Yangtze from the south near the former British Concession, provides a waterway to Tanyang, Wutsun, Wusih, Soochow, and Hangchow for vessels of up to 4 ft. draught at low river and of up to 16 ft. draught at high river. The northern section of the Grand Canal leaves the Yangtze at Kwachow, 3 miles above Chinkiang, and runs thence to Yangchow, Kaoyu, and Tsingkiangpu; draught limits are similar to those of the southern section of the canal. There are innumerable creeks radiating in all directions from the Chinkiang area, but most are available only in summer to launches and junks of any size.

The work of road construction in the Chinkiang district has proceeded steadily since 1928 when the provincial capital was moved to the port. Motor roads already in use run to Nanking, Kuyung, Kiangyin via Wutsun, Liyang via Tanyang, and northwards across the Yangtze to Yangchow; motor-bus services run to Kuyung Kiangyin, and Yangchow.

The single-track standard-gauge Huning Railway from Shanghai

to Nanking runs through Chinkiang. The main station is west of the city from which a short branch line runs to the bund of the former British Concession; the only tunnel on the Huning line is through Fort hill, west of the city.

Chinkiang is connected to the general telegraph system. There is a local telephone service and long-distance connexion with Shanghai, Nanking, and Wuhu. In 1935 the provincial government operated a broadcasting station and a W/T station in the walled city.

Nanking

Lat. 32° 3′ N., long. 118° 47′ E.	Population (1937), 1,018,795
Maritime Customs chart 22	Figs. 59, 63. Plates 82, 83

Nanking, the seat of the National Government from 1927–37, is on the south bank of the Yangtze, 215 miles by water and 193 miles by rail from Shanghai. It is a river port, industrial and communications centre, and was a rapidly growing town until the beginning of the present war with Japan.

Approach and Access

Nanking can be reached at all times by vessels drawing 27 ft., though occasionally the depths in the Ta sha north and Silver island channels below Chinkiang may limit draughts to 24 ft. At high level vessels which reach Woosung can also proceed to Nanking, that is, with a draught of 32 ft. at M.H.W.S. and of 27 ft. at M.H.W.N. At Nanking the seasonal change in the river level, which is 18 ft., is of much more importance than the rise and fall of the tide, which ranges from one ft. at low level up to 2–3½ ft. at high level. The river current always runs downstream at rates of 2–4 knots at high level, and 1½–2 knots at low level, when the effect of the tidal flood stream may sometimes be felt.

Detailed Description

The usual anchorage is near the right bank of the river, south of the western end of the Chilichow, the island formed by Tsaohsiehchia (Nanking cut-off) in 7–11 fm. mud, where the stream does not run strongly.

There are other anchorages for craft of various sizes off the left bank abreast of and above Pukow, and off the right bank at the north end of Meitzuchow, at the mouth of Chinhuai creek, abreast of the

hulk above the Customs house, and in the mouth of Tsaohsiehchia along which much junk traffic passes.

Anchorage is prohibited in an area in the centre of the harbour, where telegraph and power cables cross the river.

The Yangtze is from 900 to 1,300 yds. wide at Nanking, and deep also, especially off the right bank, where 25 fm. may be found at high water. The depths of water and heavy traffic militate against the provision of mooring buoys, but both at Pukow on the north bank and Hsiakwan on the south bank of the river, there are many pontoons and hulks for berthing; details are as follows:

Hulk or pontoon	Frontage	Depth alongside at L.W.O.S.T.	Storage capacity of hulk and/or godown	Used by
Hsiakwan	ft.	ft.	tons	
Thistle hulk	200	94	800	N.K.K.
Shah hulk	220	72	2,249	Butterfield and Swire
Leesheng hulk	160	77	300	San Peh S.N. Co.
Yungching hulk	240	78	1,677	China Merchants' S.N. Co.
Chihwo pontoon	273	60	4,920	Jardine, Matheson and Co.
Dah Doong pontoon	40	30	..	Dah Doong Flour Mill.
K.M.A. pontoon	200	30	..	Sun Tai Heng Coal Co.
N.S.R. pontoon	225	32	..	Nanking-Shanghai Railway.
Chung Hsing pontoon	115	25	..	Chung Hsing Coal Co.
Ministry of War pontoon	50	23	..	Ministry of War.
International Export Co.'s pontoons	150	23	..	International Export Co.
	170	23	..	
Pukow (all owned by the Tientsin-Pukow Railway)				
No. 1 pontoon	300	25	2,465	Ferry launches.
No. 2 pontoon	160	33	5,075	Ferry launches.
No. 3 pontoon	200	29	2,175	Various steamers.
No. 4 pontoon	200	30	2,900	Chung Hsing Coal Co.
No. 5 wharf	300	25	2,900	Various steamers.
No. 6 pontoon	160	30	3,625	Various steamers.
No. 7 pontoon	Removed (1937)		5,800	..
No. 8 pontoon	200	22	2,900	Various steamers.
No. 9 pontoon	300	16	2,900	Hwah Tung Coal Co.
No. 10 pontoon	250	22	2,900	Chung Hsing Coal Co.

Port Facilities

No. 5 wharf is equipped with a hand-operated crane to lift loads of up to 15 tons. There are adequate storage facilities in godowns and open areas along the river banks.

Bunkering of native coal, mainly from the mines at Tsaochwang in southern Shantung, may be effected in unlimited quantities from the Pukow pontoons of the coal companies, which have large coal yards there. Fuel oil for bunkering in limited quantities is provided by the oil companies. The A.P.C. has two tanks at Pukow, and one at Hsiakwan with a total capacity of 750 tons kerosine, and a tank containing 140 tons Solar oil for the city motor buses. S.O.C.O.N.Y. has a tank of 5,000 tons' capacity at Pukow, and another of 100 tons' at Hsiakwan. Water for drinking and boiler use is available from the city waterworks and delivered in junks ; fresh provisions and stores may be had in limited quantities. There are no specific facilities for repairs or salvages, but engineering firms in the city are capable of executing engine repairs. There are no proper tugs, but some of the launches used by the shipping companies for towing lighters, are available for towage on application.

The Town

The walls of Nanking are some 22 miles in circumference, enclosing an area of 15·8 square miles, which extends south-east from the Yangtze. Between the extreme north-west of the town and the Yangtze the suburb and port of Hsiakwan has developed. The city walls of grey stone are 30–70 ft. high and pierced by eighteen gates. On the north-west side a lake, Hsuanwo hu, covers 2 square miles, and the city is almost completely surrounded by moat-like canals, partly formed by the Chinhuai creek, which flows into the Yangtze at Hsiakwan. These creeks are connected with various canals running through the city, which also has numerous small lakes within its boundaries. The city is partly surrounded by marshlands, especially on the south-west, but there are low hills on the south bank of the Yangtze, and to the east the Tzuchin shan (Purple mountain) runs in an easterly direction for about 3 miles. It is chiefly famous for the tomb of the emperor Hung Wu and for the Sun Yat-sen mausoleum, erected in 1929. A memorial park was added in 1931, when sports grounds, a stadium, and a swimming pool were built.

Very little of Nanking is visible from the Yangtze, for almost all the built-up land is in the southern part of the area enclosed by the walls. The northern more hilly area is mainly cultivated land inter-

spersed with temples and graves, and the grass-grown ruins of old palaces, with scattered houses inhabited by wealthy Chinese or foreigners. The spacious plan of the northern part contrasts with the highly congested city farther south. The settlement outside the walls is comparatively slight, and except in the port of Hsiakwan it is mainly around the chief gates of the city.

No reliable information is available before 1928, but there are legends of prosperous days when the city had three million inhabitants. But after the Taiping rebellion the city was thinly populated, though its naturally favourable commercial position assured its growth even in a country slightly influenced by industrialization. In 1928 there were 497,527 people, and the city grew continuously to 1935, when there were 951,645. In that year some outlying areas were incorporated into the municipality. In 1936 the population was estimated to be 1,019,148.

The city owes much of its modern development to the centralization of government after 1927. New roads were laid out, large modern buildings were erected to house the various ministries, the law courts, and service departments, together with naval and military colleges and arsenals. The municipal area after its extension in 1935 comprised an area of 184·5 square miles.

Since it became the national capital in 1927, Nanking has been one of the seven special municipalities of China, under the direction of the Executive Yuan. The municipality is administered by a mayor, who appoints bureaux to deal with police, fire-brigade, public health, education, and other affairs of the city.

Nanking is of considerable importance also as a cultural centre. The National Central University, the University of Nanking, and Ginling College had their headquarters there before the Japanese occupation; there were several technical colleges and over three hundred secondary and elementary schools.

The Metropolitan Electricity Plant, which is under the control of the National Reconstruction Commission, has its power stations on the bund at Hsiakwan, and in the city; it supplies the municipality with electric light at 220 volts, and also with heat and power. The original capacity of the plants was 3,000 kw., but an additional generating plant of 10,000 kWh. enabled the undertaking to extend its service area. Several of the industrial concerns have their own power plants, notably that of the Tientsin–Pukow railway at Pukow.

The city is served by a new waterworks completed since 1932, but there is no modern sanitation system; much has been done

since 1927 to clean up roads and streets by the provision of drains and sewers. There are three large hospitals (two under the municipal authorities) and thirteen smaller private hospitals.

History

Nanking, then called Chienyeh, became capital of the state of Wu in the period of the 'Three Kingdoms' about A.D. 220, though a walled city had existed from the fifth or sixth century B.C. It was also a capital city under various names from A.D. 317–582, during the confused period of Chinese history when invading hordes held much of northern China and the main cultural life was in the centre and south. The ancient city covered an area in the south-central part of the present city. Hung Wu, the first Ming emperor, laid out Nanking as the largest walled city in China, but it remained the capital only from 1368–1403, when the emperor, Yung Lo, moved the seat of government to Peking and gave the city the honorary title of Nanking or 'Southern Capital.' Nanking, then known as Kiangnan, was the seat of the viceroy of the three provinces, Kiangsu, Anhwei, and Kiangsi, in the latter part of the Manchu dynasty, but was captured by the Taiping rebels in 1853 and remained their headquarters until 1864, when the Imperial armies recaptured it after a prolonged siege. No city suffered more during the rebellion, as its population was greatly reduced, its trade destroyed, and many of its beautiful, historic buildings and part of its walls reduced to ruins. Nanking became a treaty port in 1858, when it was named in the Treaty of Tientsin between China and France. But owing to the devastations of the Taiping rebellion and the slow recovery of the city the privileges granted in 1858 were not taken up until 1899. The foreign settlement marked out on the right bank of the Yangtze was an ideal site commercially, but so unhealthy that it has never been occupied. During the Revolution of 1911–12 Nanking was the seat of bitter fighting and further destruction. The revolutionaries here established the provisional government of the republic, with Sun Yat-sen as president, but in 1912 the capital was moved to Peking, and in the following year Nanking was the centre of a military revolt, and again suffered the ravages of civil war. After the great devastation suffered since the Taiping rebellion the recovery of Nanking was slow, until it once more became the national capital after the victory of the Kuomintang in 1927. In 1937 a move to Hankow and subsequently in 1938 to Chungking was made under military necessity. The Japanese occupied Nanking on 13 December 1937 after a bombard-

ment which did extensive damage; this Japanese success was accompanied by a sacking of unparalleled brutality. Since March 1940 Nanking has been the capital of the Japanese-controlled puppet government, of which Wang Ching-wei was the head until his death in late 1944.

Industries

Nanking's historic manufactures are fine silk piece-goods, pongees, satins, velvets, and brocades, but the industry has declined considerably owing to the competition of Western goods. Another ancient industry is the making of bricks from alluvium on the banks of the Yangtze. The rapid growth of the city before 1937 was accompanied by the building of new large factories for making chemicals, alcohol, and cement. Other industrial establishments include printing works, flour mills, small foundries and engineering works, government arsenals. There are a number of incubation houses and egg-factories, of which the largest is at Hsiakwan, where the International Export Co. has a large refrigerating plant. The industrial importance of Nanking has, on the whole, not kept pace with its development as an administrative and trading centre (Plates 53, 55).

Trade

The modern commercial development of Nanking has resulted largely from its political status, but it is a city of such economic resilience that it has maintained itself through countless vicissitudes. The city gathers up the surplus agricultural produce of a vast hinterland, and transports its exports and receives its imports through Hsiakwan and Pukow. Nanking itself is not a port but it will be interesting to see whether the city gradually expands to the Yangtze as its commerce becomes more oceanic.

In 1936, a total of 10,889,436 tons of shipping entered and cleared at Nanking, of which about 95 per cent. was in domestic trade. The total value of the trade of the port was $41·2 million, slightly more than half being domestic trade. Imports from abroad, which constituted the bulk of the foreign trade, were mainly railway equipment and materials, gasoline, kerosine, and lubricating oils, machinery, sugar, and timber, some of which is floated down the Yangtze, the bulk coming from the U.S.S.R. and North America. Normally, agricultural products figure prominently in the export trade. These include eggs, egg products, poultry, tea, rice, wheat, beans,

cotton, and ground-nuts. Flocks of ducks kept by the farmers along the banks of the canals are preserved in salt and exported. Most of this trade is with other parts of China, but in 1936 there was a revival of egg shipments to England. In 1936 coal was the leading export, both coastwise and abroad to Japan for the manufacture of iron and steel. Much of Nanking's trade fluctuates according to the purchasing power of the rural population, which is conditioned by the harvests; the building boom and railway construction of recent years stimulated imports. In 1936 goods from abroad were mainly from France, Germany, and U.S.A., while exports went almost entirely to Japan, Great Britain, and Hong Kong. 1936 was a favourable year for trade, in spite of increased smuggling into North China and keen competition from railway and Grand Canal traffic. The outbreak of hostilities in 1937 cut Nanking's trade by about half, and after the Japanese occupation no further trade returns were available.

Communications

The river is the main avenue of commerce, and Nanking is served by its port-suburb, Hsiakwan, and also by Pukow on the north side of the river. Goods are carried to the Yangtze along a widespread network of canals. There are regular launch services to Wuhu, Chinkiang, Yangchow, Liuho, Kulikien, and Chengkiachiao by the Yangtze and various creeks.

The ports give useful connexions with railways from Tientsin to Pukow, and from Hsiakwan to Shanghai, and the two lines are connected by a train-ferry. The Kiangnan Railway runs from Nanking to Wuhu, and the main station is outside the Chungwa men, or South gate, of the city. A loop line several miles east of Nanking connects this line to the Nanking–Shanghai railway, and there are through-carriages from Shanghai to Wuhu. The Nanking City railway runs from Hsiakwan for 8 miles to a point near the centre of the city. All the lines are of standard-gauge, and their unification into one single system, with a central station in Nanking, would add greatly to their usefulness.

There are plans for an elaborate network of macadamized roads in the city, but very little has been achieved, though an excellent road, the Changshan, runs from Hsiakwan to the Changshan men, or East gate. From this gate there are roads to Chinkiang via Kuyung, Shanghai via Wusih, and Hangchow via Ihing and Changhing, and from the South gate roads lead to Wuhu via Tangtau and

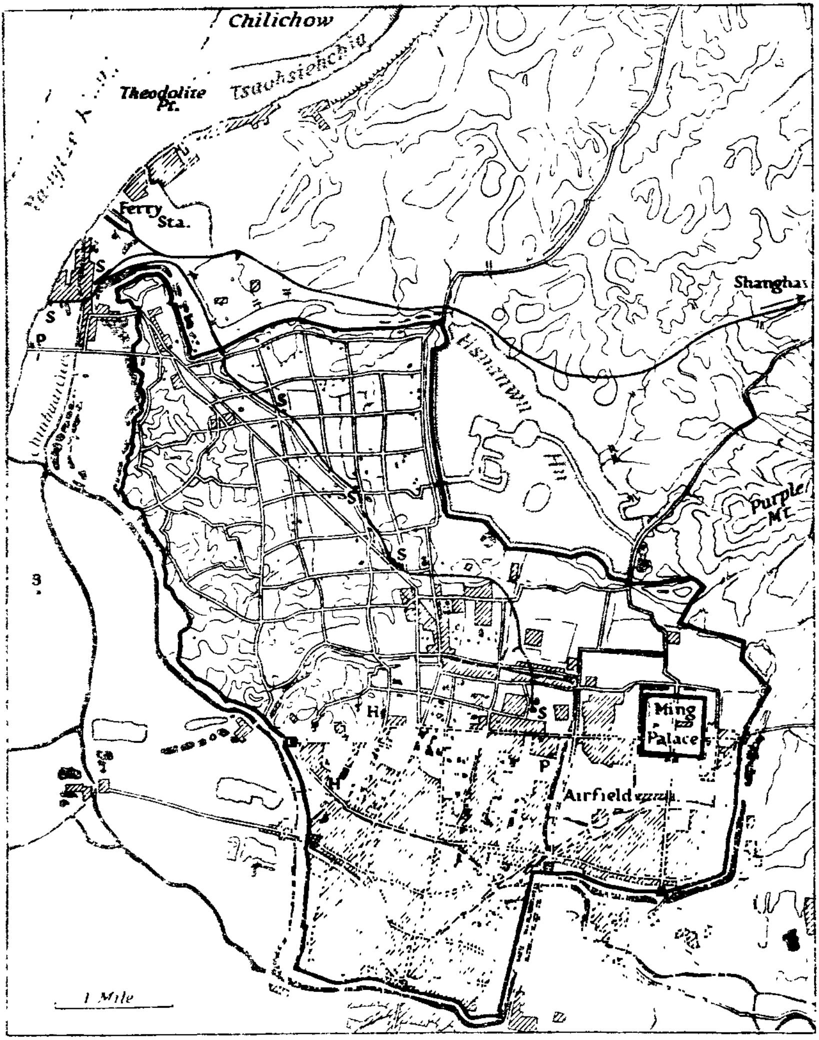


Fig. 63. Nanking

Based on 1 : 25,000 G.S.G.S., Series 3831, Nanking (1937).
The contours shown are 30 m., 50 m., 100 m., and thence by 100 m.
B, Central Broadcasting Station; H, Hospital; P, Power Station; S, Railway Station.

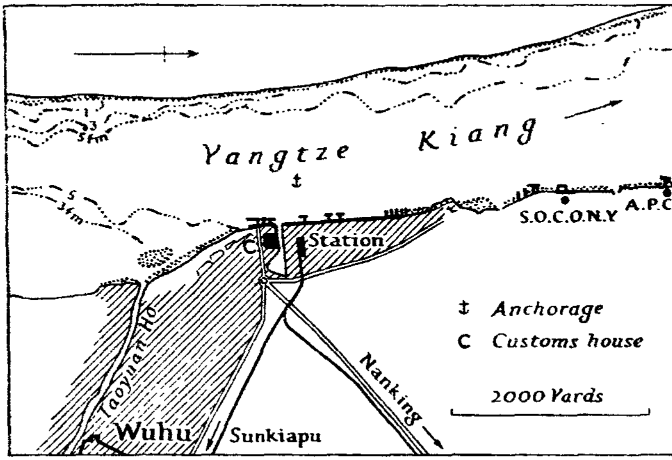


Fig. 64. Wuhu
A.P.C., Asiatic Petroleum Co.; S.O.C.O.N.Y., Standard-Vacuum Oil Co.

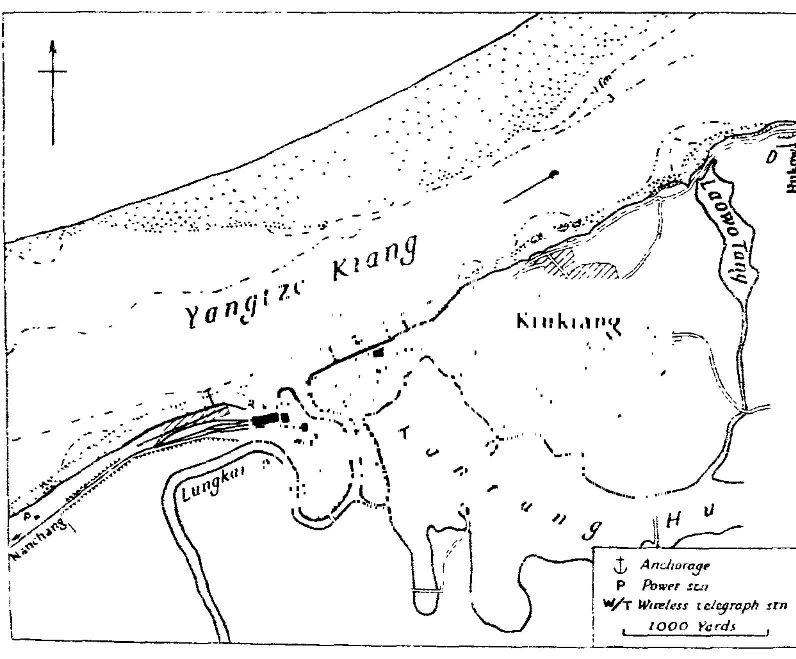


Fig. 65. Kiukiang

beyond into Anhwei, where there are connexions with the Chekiang road system. All the above roads are said to be capable of taking motor traffic, and motor-bus services operate in the municipality and to Hangchow, Wuhu, Chinkiang, and other towns in the lower Yangtze area.

Up to the beginning of hostilities three air services had a regular stop at Nanking; these were the C.N.A.C., Shanghai–Chêngtu and Shanghai–Peiping services, and the E.A.C. Shanghai–Lanchow services, which gave a connexion for Peiping from Chengchow. The commercial airfield is situated in the eastern part of the city near the Tsihwa men. Seaplanes can also land in the river.

Nanking is linked up by land lines with the general telegraph system, and has long-distance telephone connexion with Shanghai, Hankow, Tientsin, and many intermediate points. There is an automatic telephone system of over 1,000 telephones. In 1935 the Ministry of Communications operated four commercial W/T stations, which maintained direct connexion with Shanghai, Canton, Foochow, Peiping, Tsingtao, and other centres in the Yangtze valley. Before 1937 the Central Broadcasting station operated in Nanking on a wavelength of 440 metres with a power of 75 kw.

Wuhu

Lat. 31° 20′ N., long. 118° 22′ E.	Population (1934) 328,803
Admiralty chart 3181	Fig. 64. Plate 84

Wuhu is situated on the right bank of the Yangtze, at the mouth of the Taoyuan ho, 52 miles upstream from Nanking. Wuhu, which is 250 miles from the Woosung, is the chief collecting and distributing centre of Anhwei province, and has long been famous for the export of rice.

Approach and Access

Generally vessels which can reach Nanking can also reach Wuhu, that is, those with a draught of 27 ft. in the low-water season and a draught of 32 ft. in the high-water season (Fig. 91). The least water from Nanking to Wuhu is generally found in the Wade island channels. Tides are of little significance at Wuhu and are often masked by the rise or fall of the river; the spring rise is $1\frac{1}{2}$ ft. and the neap rise 1 ft. at low river, and even less at high river. The average difference between high and low river is 23 ft.; excessive floods occur from time to time and inundate much of the area around

Wuhu. The current down river runs at 2 knots in the low-water season and at 5 knots in the high-water season.

Detailed Description

At Wuhu the best anchorage for ocean and coastal vessels is in midstream outside the line of hulks and pontoons; depths are from 5 to 14 fm. in good holding ground. A large shoal off the mouth of the Taoyuan ho should be avoided and vessels must keep over on the left bank of the river. Large timber rafts proceeding down river may foul moored craft in passing.

There are no mooring buoys at Wuhu, and regular river steamers berth alongside hulks and pontoons, details of which are as follows, from the lower end of the port proceeding upstream:

Hulk or pontoon	Owner	Frontage
		ft.
Steel pontoon No. 3 ..	A.P.C.	130
Steel pontoon No. 22	S.O.C.O.N.Y.	224
Steel pontoon	Kinkai Yusen Kaisha	250
Wooden pontoon ..	Kinkai Yusen Kaisha	75
Wooden pontoon ..	Kinkai Yusen Kaisha	75
Steel pontoon	Butterfield and Swire	180
Pekin hulk	Butterfield and Swire	291
Hainan hulk	China Merchants' S.N. Co.	267
Wanan hulk	Hoong On S.N. Co.	180
Ningon pontoon ..	Hoong On S.N. Co.	167½

Inside the uppermost hulks there are several smaller pontoons for the use of steam launches; the two belonging to the Hoong On S.N. Co. are not connected to the shore.

Port Facilities

Stocks of about 500 tons of coal are maintained by local merchants, but supplies are easily available by railway from the mines at Pengpu in northern Anhwei. The A.P.C. at its installation 2 miles below the Customs house has three tanks, two of 595 tons' capacity kerosine each and one of 340 tons' capacity Solar oil. Pipe lines of 4-in. diameter for kerosine and of 3 in. diameter for Solar oil run to the company's pontoon. S.O.C.O.N.Y., half a mile farther up river, in addition to a can-making factory, has five tanks, two of 6,300 tons' capacity kerosine each, one of 370 tons' capacity kerosine, one

of 150 tons' capacity kerosine, and one of 400 tons' capacity Diesel oil; two 4-in. pipe lines run to the company's pontoon. Both companies keep stocks of about 350 tons fuel oil, with supplies of gasoline, lubricating and other oils in drums and tins. The companies operating these hulks and pontoons have ample storage space on the bund nearby.

Water is supplied by a local company from junks, but is not of good quality; provisions can be obtained in adequate quantities. There are no repair or salvage facilities, and no lifting appliances or tugs, but launches are available for towing; there is an adequate number of lighters.

The Town

Wuhu, formerly known as Kientse, is a walled city which grew up around the north of the Taoyuan ho, but at some distance from the Yangtze. The old city has narrow streets and poor buildings; the wall has been demolished and replaced by a macadamized road. The area between the city wall and the Yangtze has gradually been built over with modern buildings, which also extend south of the Taoyuan ho.

Wuhu was opened to foreign trade in 1877 according to the provisions of the Chefoo Agreement between Great Britain and China. A tract of land along the bank of the Yangtze, north-west of the city, was set aside as a foreign settlement, but was retroceded in 1906. It was well laid out with modern roads and buildings and a bunded foreshore and now forms the commercial centre.

At Wuhu there are no waterworks and no modern system of sanitation, and the district is unhealthy for Europeans in the humid summer; there is one large and one small hospital.

There are two fire-brigades and the city and suburbs are lit by electricity supplied by the Ming Yuan Electric Company's plant. Other industrial establishments include the Yu Chung cotton mills, rice mills, and a small oil mill, but there has been little development of this kind in the city.

Trade

In 1936 a total of 10,177,139 tons of shipping entered and cleared at Wuhu, of which about 95 per cent. was in domestic trade; Wuhu ranked third to Shanghai and Nanking in the domestic trade of China Proper. The total value of the trade of the port in 1936 was $43·9 million, of which about 85 per cent. was domestic trade;

a part of the domestic exports was actually destined for abroad via Shanghai. The chief items in the export trade were rice and other cereals, beans, tea, rape seed, iron ore to Japan, and coal to Shanghai for transhipment. Imports include mineral oils, sugar, cotton goods, and sundry manufactured articles. The bulk of the foreign trade of Wuhu is with Japan.

Wuhu was occupied by the Japanese in early 1938, from which date no further official details as to its trade are available; a large increase in the export of iron ore to the Yawata ironworks in Kyushu is reported.

Communications

The main water routes from Wuhu run along the Yangtze and the network of creeks and canals in the plain. Regular launch services operate to Nanking, Anking (Hwaining), Ningkwo, and other centres in Anhwei and Kiangsu provinces.

There has been much highway construction of recent years in Anhwei and roads in fair condition run to Nanking, to Hweichow via Suancheng, to Nanling, and to Wuwei across the Yangtze; motor-bus services operate along these roads.

There are three single-track standard-gauge railway lines serving the Wuhu area. From Wuhu itself lines running along the Yangtze to Nanking and south to Sunkiapu and Tawangtsung together comprise what is termed the Kiangnan railway. From Yukikow, about 7 miles downstream on the left bank of the Yangtze, another line runs north to the Hwainan coal mines near the Hwai ho.

Wuhu is linked to the general telegraphic system and has long-distance telephone connexion to Nanking and other cities in Anhwei and the neighbouring provinces. There is a local telephone system, and in 1935 two small broadcasting stations were operating.

KIUKIANG

Lat. 29° 44′ N., long. 115° 59′ E.	Population, *c.* 90,000
Chinese Admiralty chart 169	Figs. 65, 67

Kiukiang is situated on the south bank of the Yangtze, about 20 miles east of the outlet of Poyang hu. Kiukiang, which is 438 miles from the entrance of the Whangpoo at Woosung and 135 miles below Hankow, serves as a collecting and distributing centre for the Poyang lake-basin; it has lost much of its significance with the decline of the tea trade.

Approach and Access

Vessels with a draught of 15 ft. can normally reach Kiukiang at low river; at high river vessels which can reach Woosung, that is, with a draught of 32 ft., can usually ascend as far as Kinkiang. From Wuhu to Kiukiang the least water is usually found in the Christmas island channels, a short distance above Anking, but the depths in other channels may decide the draught of vessels proceeding to Kiukiang; the channels available are generally marked by the Chinese Maritime Customs.

The average difference between high and low water at Kiukiang is 36½ ft., but heavy rains often cause exceptional high water and severe floods; freshets may cause sudden fluctuations when the river is rising in early summer, but the decrease to winter level is generally steady. The rise and fall of the tide is of no significance above Wuhu. The river runs seaward at rates of one to two knots in winter, and up to five knots in summer; strong west winds increase its speed. Typhoons may occur in the summer months.

Detailed Description

The river is deep at Kiukiang and the holding ground poor; vessels moor in mid-stream within the harbour limits, but during north-easterly winter gales, when there is a considerable sea, the most sheltered anchorage is under the shelter of Oliphant island. Native

Hulk or pontoon	Owners	Length of frontage	Depth at L.W.O.S.T.	Godown storage area
		ft.	ft.	sq. ft.
A.P.C. pontoon	Asiatic Petroleum Co.	240	30 (high-water season) 8	22,221
S.O.C.O.N.Y. pontoon No. 21	Standard-Vacuum Oil Co.	225	30 (high-water season) 8	32,663
**Shengring* hulk No. 1	Ningshao S.S. Co.	263	20	..
**Shengring* hulk No. 2	Ningshao S.S. Co.	160	20	..
**Sinon* hulk	San Peh S.N. Co.	234	20	4,627
Kiangning hulk	China Merchants' S.N Co.	300	20	11,359
Pasha hulk	Butterfield and Swire	250	20	29,068
Yunghai hulk	Jardine, Matheson and Co.	275	20	23,453
**Chingnon* hulk	San Peh S.N. Co.	161	20	..
**Daisy* hulk	Nissin Kisen Kaisha	225	20	..
**Tehan* hulk	Nissin Kisen Kaisha	300	20	..
**Kianghsing* hulk	Shaohsing S.S. Co.	184	20	..

* Commandeered or withdrawn 1937.

vessels often anchor off Lungkai ho, but the anchorage here is subject to a strong eddy. Timber rafts of large size may be encountered off Kiukiang and may impede navigation.

There are no wharves but there are a number of floating hulks connected to the foreshore by pontoons and gangways. From the lower end of the port proceeding up river the pontoons and hulks are as shown in table on p. 345.

Port Facilities

The godowns are on the shore near the hulks or pontoons, none of which are equipped with cranes or lifting appliances.

Stocks of about 500 tons of Kaiping coal are kept at the port; bunkering is from lighters. The Asiatic Petroleum Co. and the Standard-Vacuum Oil Co. have installations on the right bank of the river 3 miles below the former British Concession; both companys have pontoons, equipped with pipe lines for fueling at which ocean-going vessels up to 400 ft. in length can berth. The A.P.C. has one tank of capacity 500 tons fuel oil (6-in. pipe line), one tank of capacity 1,090 tons Diesel oil (6-in. pipe line) and four tanks of total capacity 12,200 tons kerosine (3-in., 4-in., 6-in., and 8-in. pipe lines). The Standard-Vacuum Oil Co. have one tank of capacity 1,500 tons Diesel oil (two 6-in. pipe lines), and two tanks of total capacity 10,000 tons kerosine (two 6-in. pipe lines). The Texas Co. and a Chinese firm maintain stocks of kerosine in tins at godowns situated just below the port.

Limited stocks of general ships' stores and provisions are available while clean water can be obtained from Poyang hu, 16 miles below Kiukiang. Salvage facilities are negligible; the A.P.C. and the Kiukiang–Nanchang railway has workshops, which might be utilized for minor repairs. There are no tugs at Kiukiang, but there are several motor launches, and numerous iron lighters are at the service of vessels at the port.

The Town

Kiukiang was surrounded by a wall of about 5 miles in extent, which has been demolished and replaced by a roadway. Immediately south of the city is Kantang hu, from which a channel runs northward outside the east of the city to a small lake, Laowo tang, near the river. As in many Chinese cities the area inside the walls was not extensively built upon; considerable suburbs have grown up on the west of the city near the former British Concession, and beyond

Lungkai ho, a creek which runs into the Yangtze and is linked by a narrow channel with Kantang hu.

The city is lit by electricity at 220 volts, supplied by the Ying Lu Electric Company's plant. There are few industrial concerns, but a cotton mill and a match factory each employ over 1,000 hands. The Kiukiang fire-brigade has five separate sections, while Butterfield and Swire have their own fire-engine. Kiukiang has a modern drainage system but no waterworks, water being available from wells and from the Yangtze; there are five hospitals in the city. The heat of summer is very trying for foreign residents, who usually repair in the hot season to Kuling, which is situated in the Lu shan, 9 miles to the south, at an elevation of about 3,500 ft. Kuling has numerous modern bungalows and is visited by the foreign residents of Shanghai and Hankow, as well as of Kiukiang.

History

Kiukiang, which dates from the T'ang period, was opened to foreign trade in 1861 according to the provisions of the Treaty of Tientsin between Britain and China. The city was occupied by the Taiping rebels in 1853 and was largely destroyed, but grew rapidly with the establishment of the British Concession, which occupied the space to the west of the walled city, between it and the Lungkai ho. The concession is well laid out with modern buildings and a bund along the river front; it is the centre of the commercial and business life of the city and the residence of the small foreign community. In 1927 it was handed back to China along with the British Concession at Hankow, in accordance with the provisions of the Chen-O'Malley Agreement.

Trade

In 1936, 9,567,870 gross tons of shipping entered and cleared at Kuikiang, almost all being in domestic trade, in which the port ranked fourth in China Proper. The total value of the trade of the port was \$61·0 million, of which over 90 per cent. was domestic trade. The more important exports include rice, beans, tea, paper, and pottery (mainly from the famous pottery centre of Kingtechen); Kiukiang was originally an important centre of tea export, and until the opening of the Chekiang–Kiangsi railway handled large amounts of wolfram. Mineral oils, cotton yarn, sugar, and manufactured goods form the bulk of the imports. The foreign trade of Kiukiang is mainly with Japan, Great Britain, and Hong Kong. The trade

of Kiukiang improved slightly in 1937, but since the occupation of the port in 1938 by the Japanese no further data are available.

Communications

Kiukiang is an important centre of water communications. As well as regular steam-launch services to Hankow and to minor ports along the Yangtze from Tatung up to Wusueh, there are important routes leading to Nanchang and other inland towns of Kiangsi via Poyang hu and the rivers flowing into it.

From Kiukiang motor roads in fair condition run south to Lienhwatung at the foot of the Lu shan and to Nanchang via Singtzu, linking up with the main highway system of the province, west to Hukow at the entrance to Poyang hu, and east to Juichang and Wuning.

A standard-gauge single-track railway line runs south to Nanchang, a distance of 87 miles. A new bridge across the Kan kiang at Nanchang was built in 1937 to link up with the line from Hangchow via Nanchang to Chuchow on the Canton–Hankow railway.

The aeroplanes of the China National Aviation Corporation's Shanghai–Chêngtu service called at Kiukiang regularly. Landplanes used the airfield near the cotton mills above the city, and seaplanes alighted in the river where the C.N.A.C. maintained a floating pontoon ; in rough weather the Kangtan hu was used by seaplanes.

Kiukiang is connected by telegraph land lines with Kuling, Shanghai, Canton, and Hankow ; a submarine cable carrying the line to Hankow crosses the Yangtze just below Kiukiang, and another crosses it 10·3 miles below Anking. There is a local telephone service and long-distance telephone connexion with Kuling, Hankow, Nanking, Nanchang, and other inland centres of Kiangsi province.

There used to be one military W/T station and three private stations owned by the C.N.A.C., the China Merchants' S.N. Co., and the Central Bank of China respectively.

Hankow

Lat. 30° 35′ N., long. 114° 17′ E.	Population (1936), Hankow, 811,761 (1937), Wuchang, 427,130
Maritime Customs chart 16	Figs. 66–7. Plates 85–7

Hankow, situated on the left bank of the Yangtze at its junction with the Han kiang, is 584 miles up river from the Whangpoo entrance. Hankow, Hanyang, on the south bank of the Han kiang, and Wu-

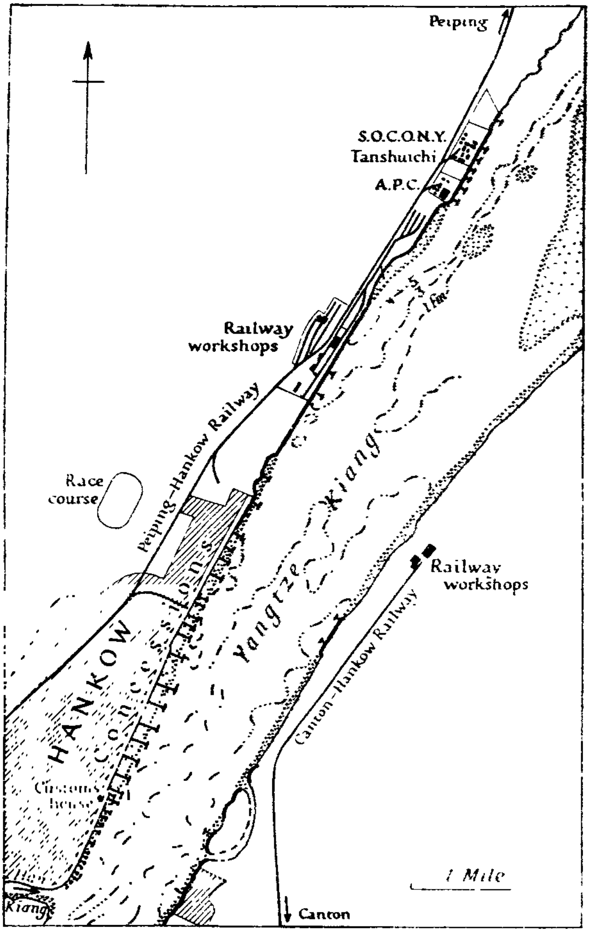


Fig. 66. Hankow

A.P.C., Asiatic Petroleum Co.; S.O.C.O.N.Y., Standard-Vacuum Oil Co.

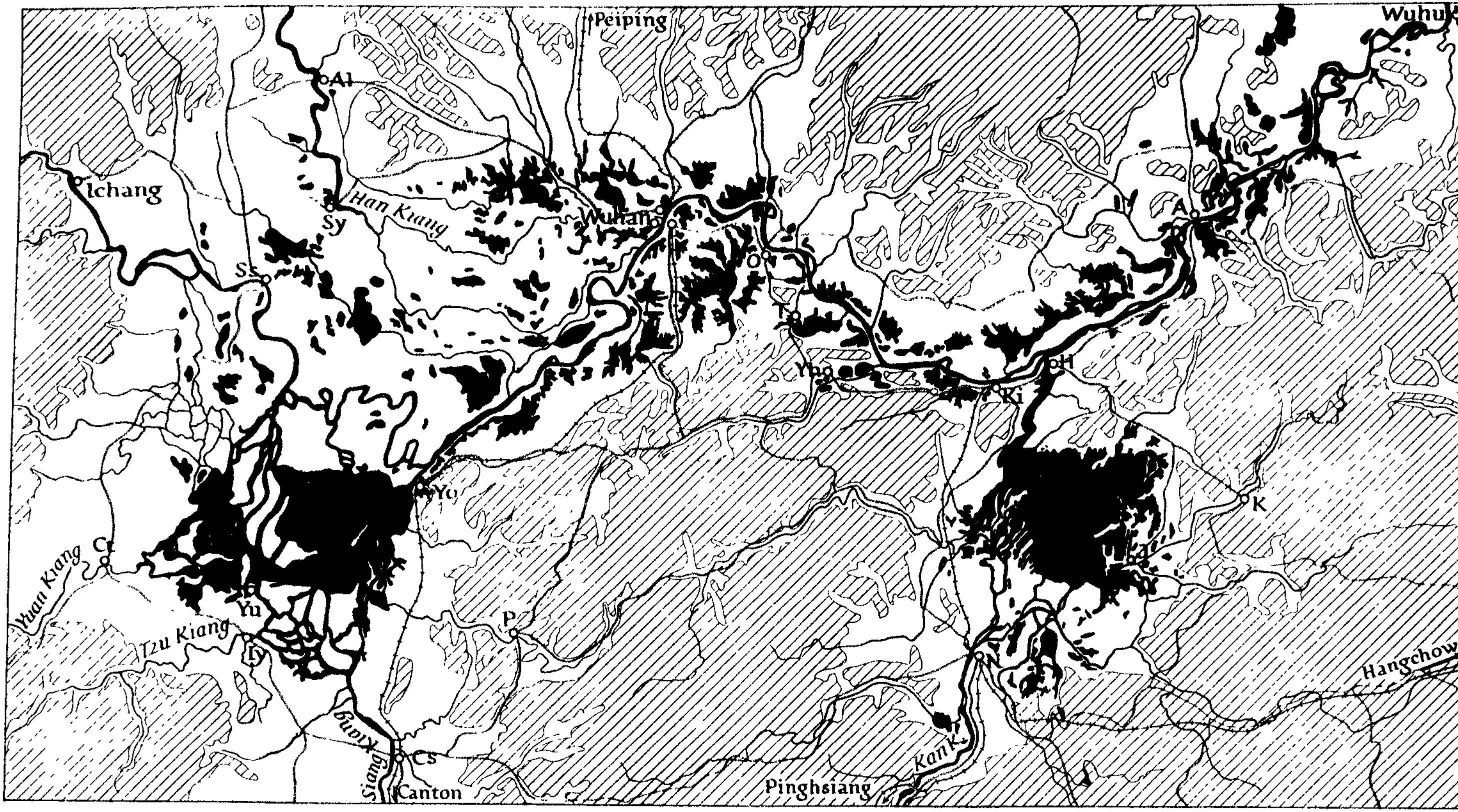


Fig. 67. The Yangtze, Wuhu to Ichang

Based on (i) 1 : 1,000,000 G.S.G.S., Series 2555, *Asia*, sheet NH 49 (1942); and (ii) 1 : 1,000,000 A.M.S. 5301, *Eastern Asia*, sheet NH 50 (1943). Red lines denote motorable roads, black crossed lines, railways; the land over 200 metres is shaded.

A, Anking; Al, Anlu; Cs, Changsha; Ct, Changteh; H, Hukow; Iy, Iyang; J, Jaochow; K, Kingtechen; Ki, Kiukiang; N, Nanchang; O, Ocheng; P, Pingkiang; Ss, Shasi; Sy, Shayang; T, Tayeh; Yh, Yanghsin; Yo, Yochow; Yu, Yuankiang.

chang, on the opposite side of the Yangtze, comprise what is known as the Wuhan group of cities, with a population approaching 1,500,000. Its central position, with a vast hinterland and well served by road, rail, and water routes, ranks Hankow as the greatest port of the Yangtze, and among the great ports of China.

Approach and Access

The depths in various channels between Kiukiang and Hankow usually decide the draught limits for the port. Generally speaking, vessels with draughts of up to 10 ft. at low level and up to 29 ft. at high level can reach Hankow. The Chinese Maritime Customs undertakes the marking of navigable channels, which are constantly changing, and the promulgation of information affecting navigation. The average difference between high and low water at Hankow is 41 ft., but 53·65 ft. was recorded in the floods of 1931, which did immense damage in the middle Yangtze and Han flood plains. Fluctuations in the level are small at low and high water, but when the river is rising or falling they may amount to 2 ft. in twelve hours. At Hankow, the stream generally runs at one knot at low river and from 4 to 5 knots at high level, occasionally increasing to 8 knots by freshets from the Han kiang. Storms of typhoonal origin rarely penetrate as far as Hankow. The harbour is exposed to north-east gales, which cause rough water and may hamper the working of cargo between vessels at anchor and lighters.

Detailed Description

The official anchorage at Hankow lies between the mouth of the Han kiang and a point below the Japanese Concession, and extends to within 440 yds. of the right bank of the river, which is here nearly a mile wide. The anchorage is divided up into twelve sections, one of which is reserved for seaplanes, and ships are assigned to their sections by the officers of the Commissioners of Customs. There are no mooring buoys, but there are over twenty hulks and pontoons connected to the shore, which is bunded along the length of the harbour. These hulks and pontoons are owned by the various shipping companies, and can accommodate craft of any size or draught able to reach Hankow; there is ample godown accommodation for cargo within easy reach of the waterfront. The following berths, with depths of 27 ft. alongside, were recommended for ocean-going vessels:

Hulk or pontoon	Owner	Length of frontage	Godown storage area
		ft.	sq. ft.
Laestrygon hulk ..	Butterfield and Swire	348	34,800
Hogee pontoon ..	International Export Co.	200	5,000
H.A.L. hulks ..	Hamburg-Amerika Line	420	50,544
N.D.L. hulks ..	Norddeutscher Lloyd	480	24,000

The following were available in 1936 for smaller ocean-going and river vessels:

Hulk or pontoon	Owner	Length of frontage
		ft.
No. 1 pontoon	China Merchants' S.N. Co.	235
No. 2 "	"	200
No. 3 "	"	300
No. 4 "	"	150
Negus hulk	Butterfield and Swire	320
Two pontoons	"	each 214
Hankow pontoon ..	Jardine, Matheson and Co.	300
Hanchung "	"	240
Wuhan "	"	157
Yuntai "	"	300
No. 1 (*Hoongon*) pontoon	San Peh S.N. Co.	280
No. 2 "	"	150

At Tanshuichi, 4½ miles below the Customs house on the left bank of the river, where the oil companies' depôts are situated, there are the following pontoons:

Owner	Number	Length	Remarks
		ft.	
Asiatic Petroleum Co. ..	2	240	6-in. and 8-in. pipe lines.
Fuchung Mining Corporation	1	240	For coaling.
Standard-Vacuum Oil Co. ..	3	150	Pipe lines.
Kwang Hwa Petroleum Co.	1	..	..
Texas Co.	1	..	Pipe line.

Port Facilities

Large stocks of coal, about 100,000 tons in all, are maintained by Dodwell and Co., Fuchung Mining Corporation, Mitsui Bussan Kaisha, and by Chinese coal dealers ; bunkering is carried out from pontoons or hulks or from tugs and lighters by baskets when the river is low. Fuel and Diesel oil in unlimited quantities are available for the oil companies' depôts at Tanshuichi. The Asiatic Petroleum Co. have tankage for 12,000 tons Diesel oil, 4,000 tons Solar oil, 4,000 tons gasoline, 26,000 tons kerosine, and maintain stocks of 70,000 tons gasoline, and of lubricants in tins and drums. The Standard-Vacuum Oil Co. has tankage for 20,000 tons Solar oil, 43,000 tons kerosine, and keeps stocks of 50,000 gallons gasoline and of lubricants in tins and drums. The Texas Co. has tankage for 2,000 tons Solar oil, 3,400 tons gasoline, and 30,000 tons kerosine, and has stocks of lubricants. The installation of the Kwang Hwa Petroleum Co., a Russian concern, was under construction in 1937. Ships' stores and general provisions are adequately supplied by numerous local firms. Water for boilers and drinking is supplied by the local water-works from lighters. Minor repairs can be effected, but there are no adequate salvage facilities. Butterfield and Swire have a small dry dock, suitable for tipping vessels of up to 500 tons, 10 ft. draught and 33 ft. beam, and for examination of and repairs to rudders and propellers ; there are numerous mud slipways for small craft. A large number of shallow draught tugs are available for towage on application to local shipping concerns. The Customs' launch *Hanting* and many of the tugs are fitted with pumps and other appliances for fire-fighting.

The Town

Hankow, formerly a neglected fishing village, and regarded merely as a suburb of Hanyang, has since far outstripped the older city in importance, as it became the chief trade emporium of the Yangtze basin, apart from Shanghai. The area of the foreign concessions along the waterfront contains many modern buildings, chiefly commercial ; the native city, which has no wall, lies farther from the Yangtze on the landward side of the Concessions area, was largely destroyed in 1911 and since been rebuilt, but not on the modernized lines once planned.

Hankow, created a special municipality in 1929, was administered from 1932 to 1938 by a council appointed by the mayor, who thus has control of the city subject to the provincial government, and

appoints bureaux in charge of the police force of 2,500, public works, public health, education, and other municipal matters.

Wuchang, the capital of Hupeh province, is a quadrangular walled city, built around a chain of low hills extending eastward from the Yangtze. As an administrative centre it includes in its southern half many fine public buildings, mainly serving as government offices. About one-third only of the wall is built upon, but an important industrial quarter has grown up between the walls and the river on the west side of the city.

Hanyang, which is also a walled city of some antiquity, lies south of Tapieh shan (Tortoise hill). Overshadowed by Hankow and Wuchang, it is best known for its iron and steel works and arsenal in its northern suburbs.

The Hankow Water and Electric Light Co. supplies water, pumped from the Han kiang, to all of Hankow, and electricity to the native city only ; its works are situated at Chiaokow on the north bank of the Han kiang, about a mile above its mouth. Wuchang has a small waterworks system built in 1935 ; water is pumped from the Yangtze, filtered, and stored in reservoirs before distribution. The Hankow Light and Power Co. supplies the former British and Russian Concessions and the French Concession, while the Japanese and the former German Concessions have their own plants. At Hanyang there are three small electricity plants, while Wuchang is lighted by the Ching Cheng Electric Co., which is controlled by the municipal government.

All three cities have adequate hospital facilities, and a quarantine hospital for the use of the port is situated on the bund at Hanyang ; the Concessions area alone has modern sanitation facilities, but the municipal authorities have done much to make Hankow cleaner.

History

As early as the Chou dynasty in the first millenium B.C. the Wuhan region was a provincial capital, occupying the site of the capital of an aboriginal tribe. During the period of the 'Three Kingdoms' Wuchang was for a time the capital of the kingdom of Wu. Under the Yuan dynasty it was the seat of government of Hukwang, a province comprising the present Hupeh, Hunan, Kwangtung, and Kwangsi. Under the Ming emperors, Kwangtung and Kwangsi were detached from Hukwang, but Wuchang still remained capital. By the nineteenth century Hankow had attained some importance as a trading and inland garrison centre, but its period of prosperity did not commence until 1861, when it was

opened as a treaty port in accordance with the provisions of the Treaty of Tientsin between Great Britain and China.

Five concessions were set up in Hankow, the first, in 1861, being the British Concession, which extended along the river bank for about half a mile and comprised an area of nearly two square miles. Next to the British Concession, and about half its size, was the Russian Concession, first set apart in 1896. Then follows the French Concession of about 60 acres, dating from 1896; the German Concession, the largest of all, with a river front of about three-quarters of a mile, dating from 1895; and finally the Japanese Concession, acquired in 1898, and 31 acres in extent. Of these, the German and Russian concessions were retroceded after the war of 1914–18, while the British Concession was handed back in 1927 as provided in the Chen-O'Malley Agreement. The retroceded concessions were termed special Administrative Districts; the ex-British Concession, Special Administrative District No. 3, is officially administered by a Sino-British Council. The French Concession is controlled by a council of nine members, of which the French consul is the chairman, and the Japanese Concession is administered by a council of five members. In 1937 the total population of the French Concession was given as 15,199, mostly Chinese, and of the Japanese Concession as 3,539, of which less than half were Chinese. The Japanese Concession was evacuated in July 1937, and completely destroyed in October 1938 by the retreating Chinese forces.

Hankow was the scene of much fighting in the Revolution of 1911, when the native city was destroyed by fire. In 1926 the Wuhan cities were captured by the Nationalist armies and Wuchang became for a short time the seat of the Nationalist government. In the following year, after the split in the Kuomintang, Hankow became the headquarters of the left-wing faction, but by 1928 the Wuhan cities supported the National Government at Nanking. In the summer of 1938, the Japanese began their campaign against Hankow, which was the national capital for some months, from their bases lower down the Yangtze at Wuhu and Nanking, and eventually occupied the Wuhan cities in October.

Industries

The Wuhan area, which is particularly well situated from the point of view of communications, raw materials, and power, forms one of China's important industrial areas (see p. 127). The most important industrial establishments were the Hanyehping iron and

steel works, which was based on iron ore from Tayeh and coal from Pinghsiang, and the arsenal nearby. The iron and steel never operated successfully, being overburdened with debt and handicapped by obsolescent machinery; the more important and useful section of the works were moved to Chungking before the Japanese occupation of Hankow (see p. 380). As a textile centre the Wuhan cities were of considerable importance. In Wuchang there are four cotton mills, and in Hankow two; there are also woollen mills, dyeing works, and silk weaving mills (Plate 35).

Other concerns in the metallurgical industry include engineering and machine works, railway workshops, foundries, and smelting works. Flour mills, a match factory, tanneries, paper mills, tobacco factories, chemical works, a brick-tea factory, and an ice-making plant are amongst other industrial establishments in the area.

Trade

In 1936, a total of 8,110,449 tons of shipping entered and cleared at Hankow; domestic trade accounts for approximately 90 per cent. of this total. The total value of the trade of the port was $353·7 million, surpassed only by Shanghai and Tientsin, but domestic trade was responsible for about seven-eighths of the figure. Statistics, however, by no means give an accurate figure of the foreign trade of Hankow, as much of the traffic passing through the port pays duty at other ports. The majority of the domestic exports, which amounted to nearly $200 million, was destined for abroad through Shanghai.

In 1937, a total of 7,025 ships, with total tonnage 3,140,599, arrived at the port. Details by flag are as follows:

Flag	No. of vessels	Tonnage
Chinese	4,420	1,385,130
British	1,793	1,194,778
Japanese	601	433,952
Norwegian ..	12	53,499
American	144	34,737
French	37	17,961
Danish	2	5,230
Italian	13	5,225
German	1	3,878
Dutch	1	3,589
Greek	1	2,620
Total ..	7,025	3,140,599

The leading imports into Hankow are cotton piece-goods and yarn, kerosine, sugar, tea for the manufacture of brick tea, tobacco in leaf, various manufactured goods, including railway materials, and rice, the quantity of the latter varying according to the local harvest. Of exports the chief were raw cotton, eggs and egg products, wood-oil, hides, ramie, bristles, beans, sesame, mineral ores, and tea; tea was once the leading article of export, but has declined steadily over a number of years.

Netherlands East Indies, Great Britain, Japan, U.S.A., and Germany were the leading sources of imports into Hankow. Exports were mainly to Great Britain, Japan, Germany, and U.S.S.R. (by land routes).

The foreign trade of Hankow fell off but slightly in 1937, but it amounted to little more than \$3·1 million in 1938, when the Japanese advance up the Yangtze prevented any ocean-going vessel from reaching the port. After 1938, so far as 'Free China' was concerned, Hankow ceased to function as a port.

Communications

The Yangtze is by far the most important means of communication to and from Hankow. Ocean-going and coastal steamers run to all parts of the China coast and many foreign ports, river steamers to all river ports from Shanghai to Ichang, and launches to numerous small towns in the province from Wusueh to Ichang. During the high-water season, river steamer and tug lighter services run to points on the Siang kiang, Yuan kiang, and Tzu Shui. The Han kiang carried a large amount of junk traffic to northern Hupeh, but steamer navigation is impossible beyond Shayang, where the river becomes shallow.

The most important roads are those to Ichang, via Shayang, which also give connexion with Shasi, to Changsha via Pingkiang, to Yanghsin via Ocheng, to Hwangchow in Honan via Macheng, and to Laohokow via Anlu. These roads are in fair condition and motor-bus services operate when weather is favourable.

The Peiping–Hankow railway runs north from Hankow, and the Hankow–Canton railway south from Wuchang. A regular ferry service across the Yangtze is maintained to connect the two systems.

Before the Japanese occupation of Hankow, the following air services were in operation: Hankow–Chungking–Chêngtu (part of the original Shanghai–Hankow–Chêngtu service), Hankow–Changsha, both operated by C.N.A.C.; Hankow–Hong Kong via Changsha,

and Hankow–Sian, to link up with the Sian–Kunming line, both operated by E.A.C. Seaplanes landed and took off from the Yangtze, while landplanes used the airfield 2 miles west of the main railway station.

The telegraph, wireless, and long-distance telephone system of Wuhan was controlled by the Ministry of Communications. Land telegraph lines run to all parts of China, and connexion is normally possible with the telegraph system of Burma and French Indo-China. The W/T station, operating under thirteen different call signals, maintained communication with Shanghai, Kunming, Canton, Chungking, Chêngtu, Nanking. In 1935 there were two broadcasting stations operating—the municipal government station at Chungshan park and a private station. Long-distance telephone services exist to numerous towns in Hupeh and to all important cities in China. The Wuhan cities also have an automatic telephone system of about 6,000 telephones, operated by the Ministry of Communications.

Yochow (Chenglin)

Lat. 29° 24′ N., long. 113° 06′ E. Population, *c.* 20,000
Admiralty charts 2849, 3274 Figs. 67, 68. Plate 88

Yochow is situated on the right bank of the outlet of the Tungting hu, about 5 miles from its junction with the Yangtze, and 134 miles above Hankow. The port, which is actually at Chenglin at the confluence, was designed to handle the trade of northern Hunan, but the opening of Changsha in 1904 robbed it of much of its significance.

Approach and Access

The navigation of the Yangtze from Hankow does not present any greater difficulty than it does below Hankow. It is not possible to give draught limits and the latest information must always be sought, as the channels and depths constantly vary. Singti east channel and Hsienfeng channel generally limit draught to Yochow and depths of as little as 7½ ft. are recorded at low river.

At Yochow the mean annual rise of the river is 42 ft., which is almost the same as at Hankow. During the high-water season, which is much longer than the low-water season, the Yangtze generally floods the alluvial plain, often breaking through the dykes constructed to control the flooding. Following exceptionally low

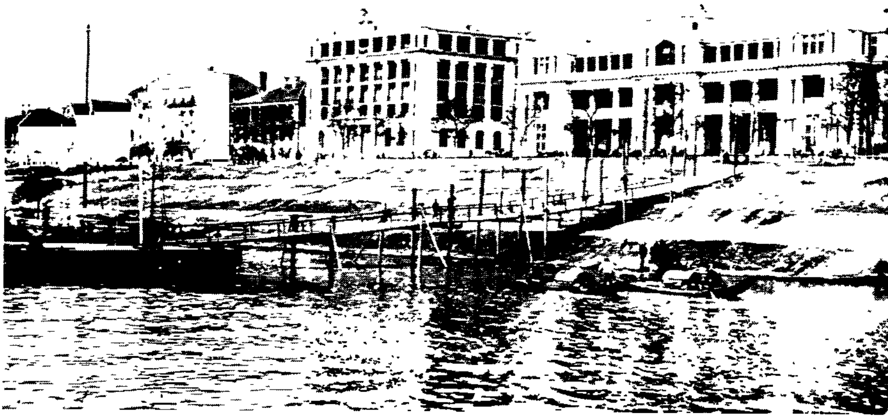


Plate 85. The Yangtze at Hankow
The waterfront at low level.

Plate 86. Indo-China S.N. Company's hulk, Hankow
A river steamer moored at a hulk in Hankow harbour.

Plate 87. The bund, Hankow
The tall building in the centre is the National City Bank

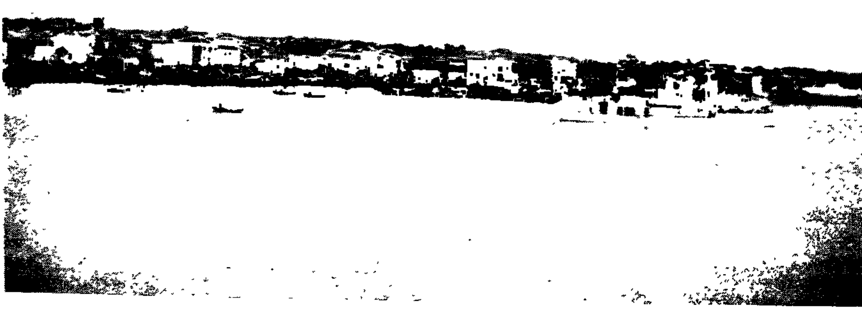


Plate 88. Yochow harbour

water in the winter of 1936–37, the Yangtze reached as high as 50·6 ft. at Chenglin in August 1937.

The rate of the stream at Yochow varies considerably, depending on the heights of the water in the Tungting hu and in the Yangtze; it often attains speeds of 6 to 7 knots.

In January 1930, Chenglin was closed to navigation by a large stationary ice field and all vessels remaining in the harbour were frozen in. Normally, however, ice does not present any difficulty to navigation.

The Chinese Maritime Customs carry out regular soundings in the river, mark the channels and issue information about navigation from time to time.

Detailed Description

The anchorage at Yochow is off the right bank close to the town at high water, but at low water is in mid-river, owing to the presence of a large shoal. The anchorage is indifferent and the stream strong, but river steamers and smaller craft usually stop there during summer. At Chenglin there is fair anchorage off the Customs house in 5 to 6 fm. at low water; the holding ground is poor north of the Customs house. Strong northerly winds or a strong stream make the anchorage unsafe and it is advisable to moor.

The Standard-Vacuum Oil Co. maintains a pontoon 245 ft. long at their installation below Chenglin for berthing their own vessels; otherwise there are no berthing facilities and all vessels anchor in the stream, loading and discharging into lighters and sampans.

Port Facilities

Stocks of about 500 tons of coal and limited quantities of fuel oil are maintained; there are three tanks at the S.O.C.O.N.Y. installation, which serves as a kerosine distributing centre for the Tungting lake-basin. Water supplies may be taken from the river and a limited quantity of fresh provisions are available.

The Town

Yochow is picturesquely situated on a red sandstone bluff about 100 ft. above the high-water level; its walls, dating from the Sung period, are quadrangular in shape, and are about 4 miles in circumference; from the west gate a flight of massive steps leads down to the water's edge.

Yochow was opened to foreign trade in 1898 by imperial decree, as compensation for the rejection of a British loan by the Imperial

government. An area at Chenglin was selected for foreign trading and settlement, and here the Customs house and business premises were established. Yochow, which has not been modernized, ranks as a healthy town and is served by one mission hospital.

Trade

Shipping, amounting to 1,837,588 tons, of which all but a tiny fraction was in domestic trade, entered and cleared at Yochow in 1936. The total value of the trade of the port was $24·6 million, almost all domestic trade. Leading imports were mineral oils (mainly kerosine), cotton piece-goods and salt. The mainstay of the export trade was wood-oil; ramie, raw cotton, cereals and beans rank next in importance. Much of the foreign trade of Yochow passes through Hankow and is recorded as domestic trade. As a port it never has been of much importance, and after the advance of the Japanese from Hankow in late 1938 it ceased to function so far as foreign trade was concerned.

Communications

Waterways are by far the most important means of communication for Yochow, the Yangtze and the Siang kiang via Tungting hu offering the main routes. Regular river steamer services operate to all Yangtze ports between Hankow and Ichang, while on the Siang kiang vessels run to Changsha. Junks and launches run to Changteh across Tungting hu and up the Yuan kiang, to Iyang across the lake and up the Tzu Shui, and to Tsingshih, Shasi, and Ichang through the lake and various creeks.

There has been little road construction in the Yochow area though motorable roads are reputed to run to Changsha, which is the highway centre of the province, and to Wuchang. The standard-gauge single-track Yuehhan Railway runs through Yochow and gives rail connexion with the Wuhan cities, Canton, and points between. The town is linked to the general telegraph system and has long-distance telephone connexion with Changsha and the Wuhan cities.

CHANGSHA

Lat. 28° 12′ N., long. 112° 59′ E. Population (1932), 381,704
Admiralty chart 3274 Figs. 67, 69. Plates 41, 89

Changsha, the capital of Hunan province, is situated on the right bank of the Siang kiang, 92½ miles upstream from Yochow and 220

miles from Hankow. Changsha is the principal commercial and trading centre of Hunan and the fertile Tungting lake-basin.

Approach and Access

From Yochow to Changsha vessels pass through the Tungting hu along the East lake route and then up the Siang kiang. Tungting hu during the winter low-water season is mostly dry with mud and sand flats, intersected by numerous shallow channels, of which the only navigable ones are those formed by the rivers which flow into the lake, the Yuan kiang, the Tzu Shui, and the Siang kiang. In summer the lake extends over an area of up to 3,000 square miles, and is navigable by vessels of up to 6 ft. draught. The rise and fall of the lake is not at present fully known, regular observations have been made only at Yochow and Changsha, where the water level is rarely influenced by the rainfall in the Siang kiang basin. At Changsha the average difference between high and low level is 18 ft., but a difference of 37 ft. has been recorded. The draught limits for the port are governed by the depths of water in the Hsianikong and other critical channels between it and Yochow. The average draught of vessels trading to Changsha is from 7 to 10 ft., and vessels of 8 ft. draught can usually reach the port from June to October. In the low-water season, the shoaling of various channels and the existence of a bar $2\frac{1}{4}$ miles below the Customs house and carrying $2\frac{1}{2}$ ft. more than the Changsha watermark, restrict navigation to vessels of not more than 4 ft. draught. When the water level there falls to 6 ft. steamer traffic ceases, as the water drops rapidly afterwards. The China Maritime Customs take regular soundings and mark the channels from Yochow to Changsha; information as to their navigability is issued periodically.

The rate of the Siang kiang stream is normally one to two knots, but during freshets and the summer rise rates of up to 4 knots are attained. Large timber rafts are frequently met with on their way downstream during high water.

Detailed Description

The river Siang abreast of Changsha is about 1,200 yards wide but is divided into two channels, each about 500 yards wide by the narrow island, Shuiluchow, which is over 2 miles long. The western channel is usually dry during low water, when the eastern channel is reduced to about 100 ft. wide.

The Changsha side of the river is bunded to a length of 4,000

yards; steps lead from the west gate of the city to the river front and also up to Shuiluchow. Ferries operate across the river from Changsha to the island and from there to the opposite bank, but a bridge across the river at this point is projected.

The best anchorage at Changsha is in the east channel just above the stone pier on the east of Shuiluchow. Here the stream is not so strong, and timber rafts keep to the other side of the river.

There are no mooring buoys at Changsha, all vessels berth alongside hulks and pontoons connected to the shore; these, four in number, are owned by various trading companies, but no details are available.

Port Facilities

There is ample godown accommodation as follows:

Owners	No. of godowns	Approximate storage area
		sq. ft.
Butterfield and Swire ..	3	28,000
Jardine, Matheson and Co.	5	22,300
China Merchants' S.N. Co.	4	16,800
Nissin Kisen Kaisha ..	3	15,600
Hoong On S.N. Co. ..	2	13,800
Bureau of Hupeh Provincial Navigation	2	3,400

There are normal stocks of up to 100 tons of bunker coal but unlimited quantities from the mines at Pinghsiang in Kiangsi could be obtained if enough notice was given. The Standard-Vacuum Oil Co.'s installation, which lies on the right bank of the river about 3 miles north of the city, has average stocks of about 100 tons of Diesel oil in drums; their pontoon, which is 130 ft. long, is approached by a channel 11 ft. in depth. The company also maintains stocks of lubricating oil, gasoline, aviation spirit, and up to a million gallons of kerosine. The A.P.C. installation, which is a mile farther downstream on the opposite bank, has average stocks of about 50 tons Diesel oil and Dieseline in drums and about 400 tons Solar oil in bulk; their pontoon, which is 100 ft. long, is equipped with a pipe line for fuelling. The company maintains similar stocks of lubricating oil, gasoline, aviation spirit, and kerosine to those of the Standard-Vacuum Oil Co. The Texas Co., which has installation near the A.P.C., maintains stocks of kerosine and gasoline.

Vessels must take supplies of water from the river; fresh provisions and general ships' stores can be obtained in limited quantities.

There are no salvage facilities, but small repairs can be carried out at the A.P.C. workshops and several small workshops. There are two firms building launches, one of which has a slipway for vessels up to 100 ft. long.

Tugs are owned by the different trading companies and are used for towing lighters between Changsha and Hankow; they can be hired by special arrangement.

The Town

Changsha is surrounded by well made walls of over 4 miles in circuit, enclosing an area of about 1,000 acres and pierced by seven gates. The streets, as in many old Chinese cities, are narrow, but are well paved and kept remarkably clean. The enclosed area is densely peopled and extensively built over with many picturesque shrines and temples. A native suburb stretches south of the city along the river bank, and there are also numerous houses in the area between the city and the river bank which prevents the walls being seen from the Siang kiang.

The foreign settlement lies to the north of the city extending for about one mile along the river bank. There are numerous commercial and administrative buildings as well as private residences along the right bank of the river north and south of the city, on Shuiluchow, and across the river near Yolu shan a thickly wooded hill, about 800 ft. high.

Changsha has always been regarded as a progressive city and is better equipped with public utilities than most cities of interior China. The Hunan Electric Co. and the Kwan Hwa Electric Co. supply light to the city and Shuiluchow at 220 volts; the power stations are situated north and south of the city. A modern waterworks is projected, but at present the city relies on water from the Siang kiang and from wells within the city. There is an efficient police force and nine fire-brigades, five of which are under the control of the Police Bureau. Changsha is a fairly healthy city, although the river is heavily polluted by sewerage during heavy rains, and is well served by five hospitals, of which the Hsiang Ya (Yale-in-China) hospital to the north of the city is particularly well known. A new modern post office building has recently been erected and a public park is being developed.

Changsha is also important as an educational and cultural centre.

Situated on the left bank of the river near Yulo shan is the provincial University of Hunan, which originated in a Confucian college celebrated in Chinese literary circles for its connexions with Chu Hsi, the famous Confucian scholar of the Sung period. The Yale-in-China Association has a medical college attached to the Hsiang Ya hospital and there are modern elementary, secondary, and technical schools.

Industries

With its growth as a commercial and administrative centre Changsha has experienced some industrial development. There are cotton mills, match factories, a glass factory, knitting factories, zinc and iron foundries, armament factories, and smelting works for non-ferrous metals in the city and its neighbourhood; smaller local industries concerned with manufacture of fancy paper and bamboo goods, brass and pewter also exist (Plate 41).

History

The name of Changsha first occurs in Chinese records of 220 B.C.; a temple to the Han scholar Chia Yi is one of the features of the old city. In the nineteenth century Changsha became famous as having successfully withstood a siege by the Taiping rebels in 1854; Tseng Kuo-fang, who ultimately crushed the Taipings, was a native of Changsha (see vol. ii, p. 35).

Changsha was open to foreign trade in 1904 as a result of the Treaty of Shanghai concluded between Japan and China in 1903, and an area north of the city was marked out for foreign settlement.

After the fall of the Wuhan cities in 1938 the Japanese directed their efforts against Changsha, which controls the northern end of the historic Siang valley route from the Yangtze basin to South China. Three victories were won there by the Chinese in September 1939, and in September and December 1941, but the city was almost entirely destroyed by fire in 1938 by the Chinese themselves. The Japanese, however, succeeded in capturing Changsha in June 1944, and pushed south beyond Hengyang, capturing Kweilin in November.

Trade

A total of 485,336 tons of shipping, all in domestic trade, entered and cleared at Changsha in 1936. The total value of the trade of the port was $600 million, of which just over 90 per cent. was domestic

trade; these figures do not represent the whole value of the trade of the port as much of the rail-borne and junk-borne freight is not under Customs control. The leading imports were mineral oils, mainly gasoline and kerosine, and sugar. Rice and minerals are by far the most important exports, wood-oil and tea oil ranking next. The following table gives an indication of the steady advance of mineral exports from 1932 to 1936 (amounts in quintals):

Mineral	1932	1933	1934	1935	1936
Antimony, crude	15,755	16,364	18,893	34,554	28,887
regulus	97,341	109,252	139,415	138,806	151,849
refuse and oxide	11,056	11,086	8,990	12,276	15,576
Wolfram (Tungsten ore)	1,829	2,235	8,892	26,681	17,710
Zinc ore	100,101	42,065	10,472	209,397	109,992
Manganese	50,040	1,300	5,655	3,628	11,059
Tin ingots and slabs	2,015	1,637	1,763	1,495	1,795

Hostilities in the middle Yangtze area led to a considerable diminution of the trade of Changsha in 1938 and 1939, but there was considerable improvement in 1940 and 1941, the value of foreign trade for January to September of the latter year being recorded at \$16·5 million. In the campaigns of late 1941 Changsha was once more a front-line city and its trade suffered accordingly.

Communications

Besides the route to Yochow and Hankow and the Yangtze ports, regularly used by steamers, important waterways run to Changteh, Iyang, Tsingshih, and other towns in the Tungting lake-basin, carrying regular launch services. Up the Siang kiang there is launch traffic to Hengyang and at high water even to Lingling (Yungchow) on the Kwangsi boundary, about 330 miles from Changsha. At Hingan, about 80 miles farther upstream, a canal runs to the upper reaches of the Kwei kiang, thus linking the Yangtze and Si kiang waterway systems (Plate 159).

Changsha is an important centre for a system of modern roads most of which are in good condition. The Hankow–Canton highway passes close by the city and gives connexion with Hengyang. The Changsha–Nanchang highway runs east via Liuyang and the Changsha–Kweiyang highway south-west through Siangtan and Shaoyang. Another road runs north-west through Yiyang, Changteh,

and thence to Shasi. Motor-bus services operate efficiently over several of these routes.

Changsha is an important stop on the Yuehhan Railway from Hankow to Canton. At Chuchow, 27 miles south of the city, a line runs east to Hangchow via Nanchang, and west to Sinhwa as part of the projected Hunan–Kweichow railway. A further line runs south-west from Hengyang to Liuchow via Kweilin.

The Eurasia Aviation Corporation operated a Peiping–Hankow–Changsha–Canton service up to 1936 and again after 1937, and the China National Aviation Corporation commenced a Hankow–Changsha service in 1937. The airfield is situated on an island at the junction of the Laishan kiang with the Siang kiang, about 4 miles below the Customs house; it is satisfactory but liable to flooding at very high water.

Changsha in peace-time has telegraph connexion with all the chief cities of China. There is a local telephone service in the city and Shuiluchow, while long-distance lines run to Hankow and the Yangtze ports to Nanking, and inland to Hengyang and many towns in Hunan, Kweichow, and Kwangsi. In 1935 the Ministry of Communications operated two W/T stations; one of these was not operating in 1937, but the Customs also had its own station.

SHASI

Lat. 30° 17′ N., long. 112° 14′ E.	Population (1935) 113, 526
Admiralty chart 3274	Figs. 67, 70. Plate 90

Shasi is situated on the left bank of the Yangtze 273 miles upstream from Hankow (though only 108 miles by land) and 84 miles below Ichang. Shasi is of no great importance, but serves as a trans-shipment centre for the trade of western Hupeh between Tungting hu and the Han kiang; it may be regarded as the port of the old walled city of Kingchow, 3 miles to the north-west.

Approach and Access

Between Yochow and Shasi the Yangtze meanders in a series of great loops and is constantly changing its channels and depths. The river is in its most unstable condition near Sunday island, and depths in the channels here usually limit draughts to the port.

Shasi is accessible to vessels of 5 ft. draught at all seasons of the year, but in summer vessels drawing 14 ft. can usually ascend from Yochow without much difficulty. The average annual difference

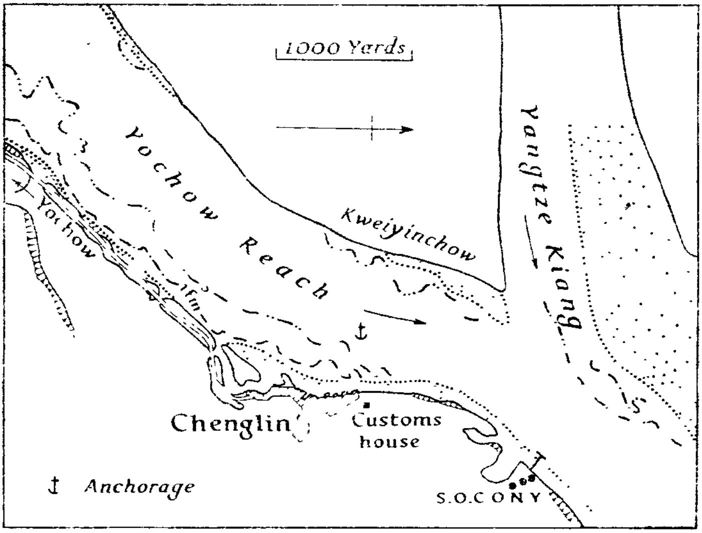


Fig. 68. Yochow (Chenglin)
S.O.C.O.N.Y., Standard-Vacuum Oil Co.

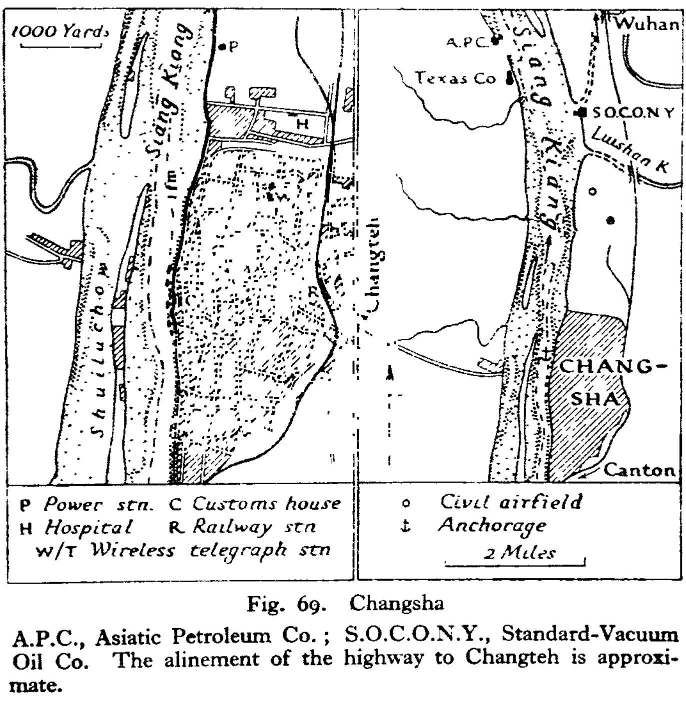


Fig. 69. Changsha

A.P.C., Asiatic Petroleum Co.; S.O.C.O.N.Y., Standard-Vacuum Oil Co. The alinement of the highway to Changteh is approximate.

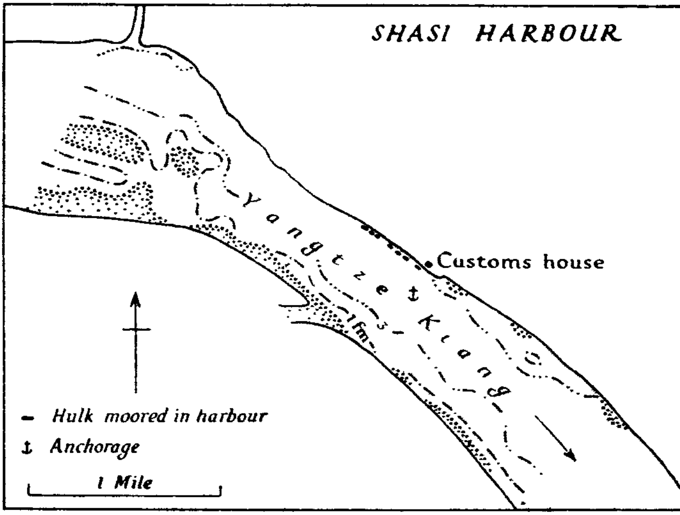


Fig. 70. Shasi

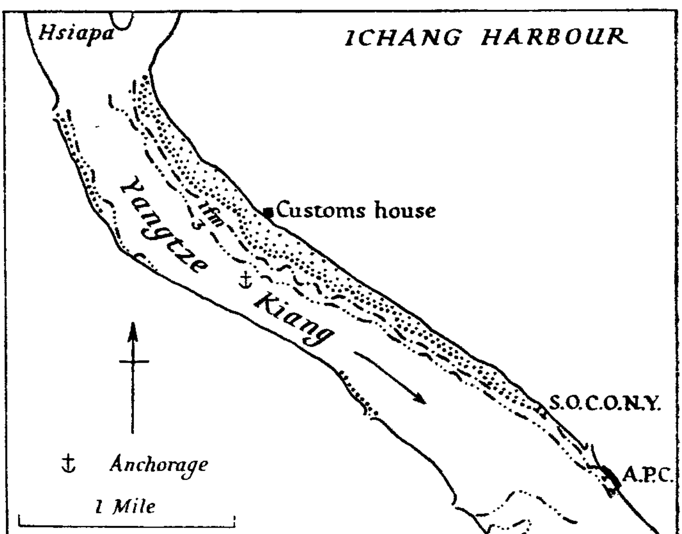


Fig. 71. Ichang

A.P.C., Asiatic Petroleum Co.; S.O.C.O.N.Y., Standard-Vacuum Oil Co.

in levels is only about 30 ft. (see p. 525), but the river has on occasions exceeded this figure and attained a height of 35·3 ft. in July 1935. On such occasions the cultivated plain near the port is completely inundated and severe damage may be caused to the dykes built to restrict the ravages of flooding. As in other parts of the middle Yangtze, the China Maritime Customs regularly sound and mark the channels and give information as to their navigability. During low river the stream at Shasi runs at two to three knots, but at high river, a rate of as much as 9 knots has been recorded.

Detailed Description

Owing to the strength of the stream which makes contact with the shore difficult, and the shifting nature of the shingly river bottom, the anchorage at Shasi, where the river is about 600 yards wide, is very unsatisfactory. In the high-water season vessels often anchor off the south bank, where the current is less strong. The north bank of the river is bunded for a length of 500 yards ; this bund is composed of three tiers, each 12 ft. high, with a promenade on top. Shasi is one of the points at which heavy junks trans-ship their cargoes into smaller junks and barges, large numbers of which may be moored to the bund or to the river bank opposite. No mooring buoys are provided, but there is ample space for anchoring. Bathing facilities are provided by hulks and pontoons as follows :

Hulk or pontoon	Owner	Length of frontage	Remarks
		ft.	
Hankow hulk	Butterfield and Swire	300	Storage for 800 tons of cargo.
N.K.K. hulk	Nissin Kisen Kaisha	220	Storage for 400 tons of cargo.
Yungan hulk	San Peh S.N. Co.	140	Also used by China Merchants' S.N.Co.
pontoon	Hankow Press Packing Co.	78	Electric pumping installation.
pontoon	China Maritime Customs	62½	Small craft only.
pontoon	Shasi Chamber of Commerce	140	Half-mile above bund.

Port Facilities

The shipping companies and the Hankow Press Packing Company have numerous godowns with adequate storage space for the needs of the port, which is, on the whole, very poorly equipped.

A stock of not more than 100 tons of coal is usually maintained. The A.P.C. has storage for 180 tons of fuel oil in barrels or drums, but the fuel oil supplies at Shasi are very limited though all the oil companies have large stocks of kerosine for distribution locally. Water can be obtained only from the Yangtze and very little in the way of provisions or stores is available.

The Town

Shasi extends in a straggling fashion along the river front for a distance of 3 or 4 miles. It is an unattractive and squalid city with only one well-paved street back of the bund. Apart from commercial and administrative establishments there are few modern buildings.

As early as the T'ang period, Shasi was a trading centre of some importance; it enjoyed great prosperity during the Taiping rebellion when trade lower down on the Yangtze was largely at a standstill. It was opened to foreign trade in 1896 according to the provisions of the Treaty of Shimonseki between China and Japan; an area by the river below the town was assigned to Japan as a concession area in 1898 but was never developed, and has since undergone considerable erosion.

Among the industrial establishments of the city are the Shasi Cotton Weaving and Spinning Factory, the Hankow Press Packing Company, flour mills, and an ice-making plant; these have their own small electricity plants. The Pu Chao Electric Co. supplies the city with electricity, but the voltage is low and the lighting inefficient; a hydro-electric station of 20,000 kw. is planned. There is no modern waterworks or sanitation system, and there are four small hospitals. There is no official fire-brigade, but there are a number of privately owned hand-pumps.

Trade

Shasi, though situated in a fertile plain, producing much raw cotton, cotton seed, beans and cereals, has failed to develop as an important trading centre.

In 1936 the total tonnage of shipping, all in domestic trade, entered and cleared at Shasi, amounted to 1,263,690. The trade of the port in the same year was in value $21·7 million, almost all domestic trade. Sugar was the main item of a small quantity of foreign imports, the leading domestic imports being cotton piece-goods, salt, and cigarettes. Raw cotton, sesamum seed, rice, beans,

and cotton yarn constitute the bulk of the exports. The hostilities in the middle Yangtze area which have continued since 1939 have resulted in the virtual cessation of trade at Shasi.

Communications

By means of creeks and canals, particularly the Taiping ho, Shasi has easy water connexions with towns in the Yangtze plain from the Han kiang south to Tungting hu. Junk and river steamer traffic runs from the port to many points between Hankow and Chungking. The main road from Shasi runs north to the road junction at Shihlipu with the main Hankow–Ichang road and thence to Siangyin on the Han kiang; from the south bank of the river a road runs to Changsha via Changteh. These roads are of fair quality, but liable to flooding after rains; motor-bus services operate to Hankow, Ichang, and Siangyin. The seaplanes of the C.N.A.C. Hankow–Chungking service used to call regularly at Shasi, landing and taking off in the Yangtze. Shasi is connected to the general telegraph system and has a small local telephone system.

ICHANG

Lat. 34° 42′ N., long. 11° 17′ E.	Population, *c.* 110,000
Admiralty chart 3274	Figs. 67, 71. Plate 91

Ichang is situated on the left bank of the Yangtze, 383 miles by water above Hankow, and 350 miles below Chungking. It derives its importance as the chief trans-shipping point for goods in transit between the middle and upper Yangtze.

Approach and Access

At Spring reach, about 40 miles above Shasi, the Yangtze no longer flows through a level plain but through hilly country which gradually becomes more mountainous as one travels westward. The Yangtze gorges proper begin above Ichang, but the famous Tiger's Teeth gorge is about 10 miles below Ichang. The draught limits for Ichang (Fig. 91) are similar to those for Shasi, 14 ft. during the high-water season, 5 ft. during the low-water season, as the river between does not present any greater difficulty than it does for Yochow to Shasi; the average draught of vessels trading to and from the port was from 7 to 10 ft. The average difference between high and low water at Ichang is 43 ft., but differences of over 50 ft. have been re-

corded (see p. 525). When rising the level is subject to considerable fluctuations, but the fall in autumn is more uniform. Access to the port has been made much easier by the work of the China Maritime Customs Marine Department which has established numerous aids to navigation.

The rate of the stream at Ichang is normally about 2 knots in winter and about 5 knots in summer, but during spring and summer freshets may reach 8 knots.

Detailed Description

The anchorage at Ichang off the left bank is good, except in freshets, when the best holding ground is at the lower end of the harbour near the right bank. The small island of Hsiapa, which is joined to the left bank by a narrow isthmus just above Ichang for most of the year, forms a harbour clear of the stream. Junks generally secure to the shore along the front of the city. The river, which is 650 yards wide at low water and increases to about half a mile at high water, is shoaler off the left bank than off the right bank.

At Ichang vessels either anchor in the stream, loading and discharging cargo by means of lighters, or berth at one of the following pontoons :

Pontoon	Owners	Length of frontage
		ft.
No. 14	Asiatic Petroleum Co.	140
No. 15		140
No. 140	Standard-Vacuum Oil Co.	60
No. 190		180
Ningpo	Ming Sung Industrial Co.	122
Lower		82½
Postal	Chinese Postal Administration	120

Port Facilities

There is ample space for mooring, but to avoid congestion the harbour is divided into sections which are allotted to the various shipping companies. There is ample storage space in the godowns of the commercial firms along the river bank.

Bunker coal from mines in Szechwan can be obtained in unlimited quantities if sufficient notice is given, about 200 tons being normally kept in stock ; bunkering is by basket from lighters. The Asiatic Petroleum Co. and the Standard-Vacuum Oil Co. have installations about two miles below the Customs house, with tanks

for fuel oil and kerosine ; about 4,000 tons of fuel are usually stocked. All supplies of water are drawn from the Yangtze, but here, as for other Yangtze ports, river water should be boiled before drinking. Local firms can supply limited quantities of provisions and ships' stores.

There are facilities for small repairs and a local firm has pumps and hydraulic jacks for salvage purposes. Coal lighters and steam launches are stationed at the port, while the Ming Sung Industrial Co. has a tug, the *Ming Ho*, fitted for navigation of the upper river.

The Town

Ichang, the gateway to the upper Yangtze, is an ancient city, and was called Ising in the time of the Sui dynasty. It is surrounded by crenellated walls, pierced by six or seven gateways. The walled city is closely built-over with narrow dirty streets, but suburbs with shops and commercial buildings have grown up on the west and south sides of the city, between it and the river bank. The foreign quarter to the south-east of the walled city is bunded along the waterfront ; a local council, supported by voluntary contributions, looks after the drains, roads, and lighting of the quarter, which has numerous modern buildings. Ichang was opened to foreign trade in 1877 as provided for by the Chefoo Agreement, concluded between Great Britain and China in 1876.

Ichang is lit with electricity and there is a volunteer fire-brigade without up-to-date equipment, under the control of the Public Safety Bureau ; Butterfield and Swire and Jordan, Matheson and Co. maintain their own fire-fighting appliances.

There is no modern waterworks, and all water is taken from the river ; sanitation is very primitive, and sewerage pollutes the river badly during the heavy rains. There is one large and three small hospitals at Ichang.

After the Japanese drive up the Yangtze from Hankow in 1938, Ichang was frequently subject to air bombardment, but did not fall until June 1940. The city remains in Japanese hands, but periodic counter attacks by the Chinese have prevented the invaders from extending their control beyond Kienping, 2 miles upstream.

Trade

Shipping amounting to 1,366,631 tons, all in domestic trade, entered and cleared at Ichang in 1936. The total value of the trade of the port amounted to \$15·1 million, of which all but a small

quantity of imports was domestic trade; exports destined for abroad are transhipped at Shanghai or some other port and appear in the records as domestic exports, a phenomenon common in the Yangtze ports above Shanghai. The leading imports were kerosine, cotton yarn and piece-goods and refined sugar; wood-oil and vegetable tallow formed the bulk of the exports.

Hostilities in the middle Yangtze area were acutely felt at Ichang up to its capture in 1940, when it practically ceased to function as a port.

Communications

A railway from Hankow to Chêngtu was projected in 1914 and about 14 miles of the Ichang–Chungking sections were laid; the project was abandoned in 1915 and the rails taken up.

The main road from Ichang runs west via Tangyang and Shayang on the Han kiang to Hankow. The surface is poor, and flooding occurs after heavy rains, but a motor-bus service uses the road regularly. At Shihlihu a branch road runs south to Shasi, and a road to Patung, 54 miles up river from Ichang, was projected.

The most important means of communication is the Yangtze, along which there is a never-ending stream of junks, launches, and steamers linking Ichang to all upper and middle Yangtze ports. An alternative water route to Yochow runs via the Yangtze and various creeks to Tungting hu.

Ichang was a regular station on the Shanghai–Chêngtu and Hankow–Chungking service, operated by the China National Aviation Corporation. The landplanes employed on the former service used the Tiehlupa airfield one mile north-east of the city, while the seaplanes on the latter service used the river abreast of the Standard-Vacuum Oil Co.'s installation.

Ichang is connected to the general telegraph system; as well as the commercial W/T station, there are two military W/T stations.

WANHSIEN

Lat. 30° 49′ N., 108° 22′ E.	Population, *c.* 150,000
Maritime Customs chart 222	Plate 92

Wanhsien is situated on the left bank of the Yangtze, 177 miles above Ichang and 173 miles below Chungking; it is a trading and distributing centre for eastern Szechwan in a commanding position at the head of the gorges.

Plate 89. Changsha harbour

Plate 90. Shasi harbour

The Yangtze at Shasi, where the bund is built in three tiers ; on the left is the *Yungan* hulk, owned by the San Peh S.N. Co.

Plate 91. The Yangtze at Ichang
A view of river steamers and junks in the anchorage at Ichang.

Plate 92. Wanhsien
At Wanhsien, a small stream, the Tienshengkiao, here shown at its low winter level, joins the Yangtze, which may be seen in the right background.

Approach and Access

The upper Yangtze presents complex problems of navigation (see p. 534). Local knowledge is essential for a safe journey, and it is advisable to use Chinese pilots, who are generally extremely efficient. The Marine Department of the China Maritime Customs carry out much useful marking, establish signal stations at dangerous points, and issue regulations and advice on the navigation of this difficult section of the river up to Chungking.

At Wanhsien the river is lowest in February and highest in late July or early August; the mean difference between high and low level is 110 ft., but levels after freshets are much higher, 137·5 ft. being recorded in 1921. The current runs at 1½–3 knots in winter and at 4–8 knots normally in summer, but these rates may be increased after rains.

Detailed Description

At low and mid levels a good but restricted anchorage is available off the right bank at the upper extremity of the shingle bank known as Womeichi; at high water more berths are available, but great caution is necessary as there is an extensive deposit of shingle. There is a good securing place at low and mid levels below the city at Chuyuto. There are seven pontoons off the left bank of the river, of which that owned by the Ming Sung Industrial Co., 132 ft. long, is the most important, and one on the right bank.

Port Facilities

It is not usual to bunker at Wanhsien though coal is found in many parts of eastern Szechwan, and the A.P.C., the Standard-Vacuum Oil Co., and the Texas Co. have installations mainly for kerosine on the left bank near Chuyuto. Water is taken from the Yangtze and supplies of provisions and stores are very limited.

The Town

Wanhsien, opened to trade in 1917, is a walled city picturesquely situated on hilly ground immediately north of the junction of a small river, the Tienshengkiao, with the Yangtze. The walls are heavily built in the medieval Chinese style and pierced by gates; long flights of steps lead down to the waterfront. South of Tienshengkiao extensive suburbs have grown up at Nanchinkai along the river bank for upwards of half-a-mile; here are most of the commercial and official buildings.

Industries

There has been some recent industrial development at Wanhsien; there are flour mills, paper mills, building yards for junks, and a handloom cotton weaving industry, while the Kwong Mu Electric Co. has a small light and power plant, now state-controlled.

Trade

A total of 980,268 tons of shipping, all in domestic trade, entered and cleared at Wanhsien in 1936. The total value of the trade of the port was $25·0 million, almost all domestic trade. The leading imports were kerosine, cotton piece-goods and yarn, and tobacco; wood-oil was the only important export, amounting to 72 per cent. of the whole export trade. Though Wanhsien still remains free from hostilities, its trade has remained unsettled, though showing some improvement with the war-time development of Szechwan.

Communications

The Yangtze, difficult as it is, provides the main line of communication between Wanhsien and towns in Szechwan and Hupeh. The most important of the companies operating regular services on the upper Yangtze is the Ming Sung Industrial Co., with a fleet of 26 steamers and motor vessels; other companies operating two or more steamers and motor vessels on the Ichang–Chungking route are the China Navigation Co. (Butterfield and Swire), Indo-China Navigation Co. (Jardine, Matheson and Co.), A.P.C., Standard-Vacuum Oil Co., San Peh S.N. Co., Nissin Kisen Kaisha, *Union Franco-Chinoise de Navigation*, *Societa di Navigazione Fluviale Italo-Cinese*. The only motor road which is in good condition runs westward to Suining on the Suining ho, an important road centre giving communication with Chêngtu and Chungking; a shorter route to Chungking branching off from Tachu was in course of construction in 1942. Seaplanes of the C.N.A.C. Hankow–Chungking service used a landing place near the company's pontoon in the river near Chuyuto. Wanhsien is linked to the general telegraph system, and has long-distance telephone connexions with Chungking and Kaihsien.

CHUNGKING

Lat. 29° 33′ N., long. 106° 34′ E. Population (1944), 928,668
Maritime Customs charts 13, 238 Figs. 72, 73. Plates 93, 94

Chungking (or Pahsien), the war-time capital of the Republic of China, is situated on the left bank of the Yangtze at its confluence

with the Kialing kiang, 1,291 miles by river from Woosung. Chungking, well served by water routes, had become the commercial capital not only of Szechwan but of western China.

Approach and Access

The problems of navigation on the upper Yangtze are discussed elsewhere (see p. 534). During low water vessels 140 ft. long and 6 ft. in draught can reach Chungking, and at high water vessels 220 ft. long and 10 ft. in draught. On the approach of winter the level of the river falls and remains at low levels, up to 5 ft. during January–March; the minimum occurs in February, a depth of 2·4 ft. below the zero of the river gauge being recorded in 1937, when steamer communication with Ichang was suspended for three weeks. In April the river starts to rise with occasional minor falls, reaching its high levels 35–45 ft. and over in July–September; sudden rises often increase depths considerably, 106·9 ft. being recorded in 1905. The average difference between high and low water is 73 ft. Towards the end of September the river begins to fall once more to its low level. Sudden fluctuations of as much as 20 ft. may be experienced, especially during the rise; but the fall, though not undisturbed, is steady. At low level the current runs at about 2½ knots, but after heavy rains in summer the river becomes a roaring torrent, and communications from bank to bank are rendered dangerous and difficult.

Detailed Description

Chungking harbour stretches in a large curve, 3½ miles long, from abreast of Chiaochuento in the north, to abreast of Huangkotu in the south. It is from 250 yards to 400 yards wide at its lowest levels, but almost doubles in width during summer. The least depth in the harbour in the channel near Chuerhshih is 8 ft. at zero level on the river gauge, but there is ample depth at many points for much larger vessels than can reach Chungking. The deep water generally reaches close up to the rocky ledges on each side of the river, but there is shallow water off the sandbank and shingle bed extending along the eastern face of the city above its confluence with the Kialing kiang. At low water the stream normally runs at 2½ knots, but at high water rates of up to 9 knots may occur.

On the west or left bank of the river, some distance above the lower harbour limits, is a rocky reef, Liangto, which covers at 42 ft. above zero level; at low levels and to some extent at mid levels, the

bay behind the reef offers a safe securing place for junks and steamers. On the eastern side there are numerous small bays, offering good securing places, of which the most useful are Wangchiato, sheltered by a rocky ledge and the sheltered bay off Lungmenhao. There are various sandspits, shingle beds, reefs, and rocks dangerous to shipping; races, whirlpools, and eddies may be caused by freshets coming down the Kialing kiang, and by reef and rocks at varying levels.

There are no mooring buoys or wharves; vessels secure to wooden or steel pontoons, owned by the shipping, petroleum, and vegetable-oil companies, which are spar-moored and anchored off the river bank at suitable points. Butterfield and Swire have two pontoons and two hulks off Lungmenhao, and Jardine, Matheson and Co. one pontoon half a mile below, with a tank for wood-oil and a derrick and hand-winch for 5-ton lifts. Other pontoons on the same side of the river are maintained by the San Peh S.N. Co., the Ming Sung Industrial Co., and the *Union Franco-Chinoise de Navigation*. On the other side there are numerous small pontoons for the use of steam launches.

Port Facilities

Any quantity of bunker coal is available from local mines, bunkering being by baskets from coal junks; fuel oil is provided by the oil companies. The A.P.C. oil installation is at Tangkiato, 8 miles below Chungking on the left bank of the river, with tank capacity for approximately 8,100 tons of kerosine, 2,750 tons of Diesel oil, 2,600 tons of Solar oil, and 5,700 tons of benzine; stocks of aviation spirit in tins and of lubricating oil in drums are also carried. The company has two pontoons for berthing there, each 140 ft. long, with a depth of 5·3 ft.; fuelling is by four 6-in. pipe lines. The Standard-Vacuum Oil Co.'s installation is 2¾ miles above Chungking on the right bank of the river, with tank capacity for about 15,000 tons of kerosine, 3,300 tons Diesel oil, and 150 tons of benzine; stocks of gasoline, aviation spirit, and lubricating oil in drums are also maintained. The Texas Co. carries stocks of kerosine, gasoline, and lubricating oil. Vessels draw water directly from the Yangtze for their own use; ample stocks of provisions and general stores are maintained by local merchants. There are no docking facilities, but there are several boat yards for repairs to steamers and launches of which the most important, owned by the Ming Sung Industrial Co., is in the bay inside Liangto, and is

equipped with a derrick capable of lifting 20 tons. The An Tai Engineering Works carries out repairs for foreign shipping firms, but has no crane facilities. There are no tugs at the port, but there are a large number of steam and motor vessels suitable for towing.

The Town

Chungking is built on a rocky promontory of red sandstone, bounded on three sides by the waters of the Yangtze kiang and of the Kialing kiang and rising abruptly from the rivers into two hills. It is surrounded by a crenellated wall, 100 ft. in height, for a circuit of about 5 miles, which is pierced by 17 gates, of which 8 were generally closed. This wall, which is in bad repair and now partially demolished, was built in 1761 to replace one of an earlier date. The gates are reached from the river by long flights of steps which are largely covered at high water (Fig. 73).

The area within the walls was completely built over, unusual for a Chinese city, and became densely crowded. Furthermore, the city until recent times had not grown outside its wall, apart from temporary buildings along the foreshore fringe which were removed when the river rose. Accordingly, within the walls there was a maze of narrow paved streets with no definite pattern, following the topography of the unusually hilly site with the aid of many flights of steps. Certain streets were bounded by walls and were used mainly for transport and communication.

Up to 1925, almost no real changes had occurred in the layout of Chungking or its suburbs, but by 1930 a movement to modernize the city was well under way. The hilly terrain and the crowded space made this a difficult task, but considerable headway had been made even before 1937, and the destruction of a large part of the city provided an excellent opportunity for town planning, with extension of the city inland outside the walls.

On the north side of the river confluence is the smaller walled city of Kiangpei, formerly under separate jurisdiction, but now included in the Chungking municipality; the walls of Kiangpei have also been largely demolished. Both Chungking and Kiangpei contained a large number of beautiful buildings: temples, guild-halls, official and private residences, many of which have been destroyed by aerial bombardment by the Japanese. The majority of the foreign population reside on the right bank of the Yangtze opposite the city, where the offices of many shipping and commercial firms are situated.

The right bank or South shore section was never thickly populated until recent years, as the wide expanse of the Yangtze was too difficult to cross regularly. The construction of a bridge across the Yangtze would undoubtedly prove a great boon, and has been a long-meditated plan, together with the construction of a bridge over the Kialing kiang to Kiangpei. There are four chief villages on the South shore, Haitangchi, the terminus of the highway to Kweiyang, Shihtzushan, Lungmenhao, and Wangchiato, which have all grown considerably with river port developments.

The increase in the population of Chungking has been in step with its growth in importance. The 1927 population was recorded as 208,294, by 1934 it had increased to 297,704, by 1940 to 417,379, while at the end of August 1942 the Chungking Police Bureau reported that it was 723,704; the figures for August 1944 were 928,668. The municipal limits have been extended to include an area of about 75,000 acres, three times as great as that of the municipality before expansion and responsible in some degree for the great increase in population. The foreign residents, previously never exceeding 200, have increased considerably since 1937, and numbered 1,729 in July 1944. About half the population is resident in the walled city, the remainder being divided equally between the walled city suburbs, Kiangpei and its suburbs, and the South shore section.

Before 1927 a superintendent was in charge of the municipal and commercial port affairs of Chungking, but in that year the municipal government came into being under the Szechwan provincial government. Various changes in the administrative framework took place after 1935, and in 1944 the most important departments of the municipal government, which is under the control of the mayor, were the Social Welfare Bureau, the Finance Bureau, the Police Bureau, the Public Health Bureau, the Food Administrative Bureau, the Censorship Bureau, the Education Bureau, and the Public Works Bureau.

The Social Welfare Bureau sponsors such activities as the provision of public dining-halls offering meals at cheap prices, mass weddings, the sale of necessities at low prices, and the control of prices, in conjunction with the Public Works, Food Administration, and Police Bureaux.

The Finance Bureau has charge of the imposition and collection of local and municipal taxes, and particularly the work of land registration and the fixing of a land value tax. The Police Bureau as well as policing the municipality carries out an annual census,

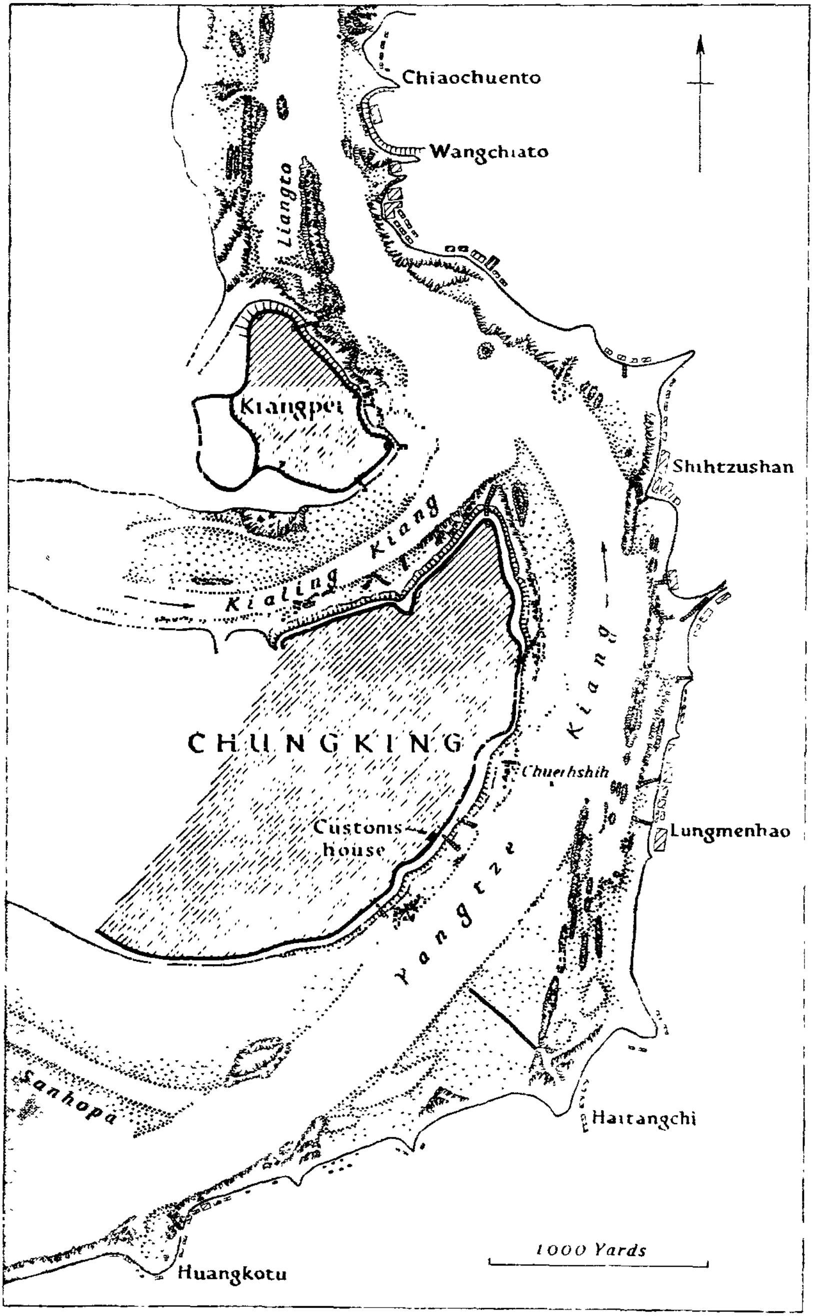


Fig. 72. Chungking harbour
The shore line is that of mean high river.

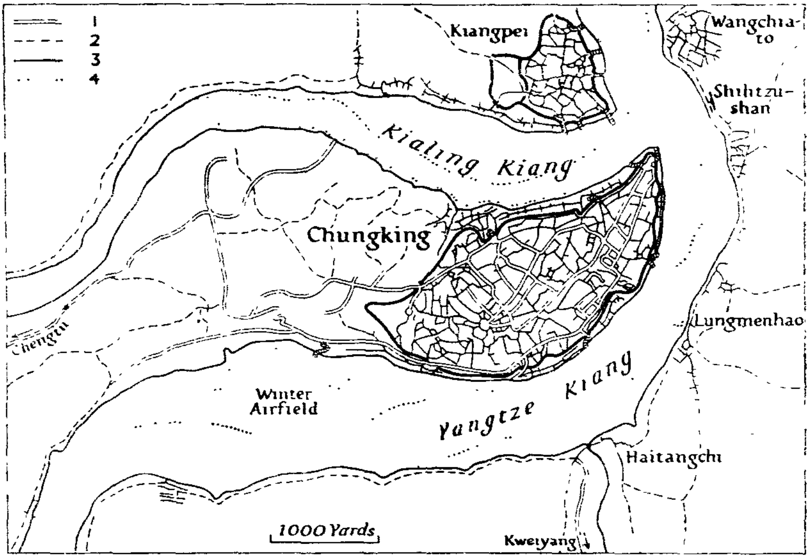


Fig. 73. Chungking

Based on Spencer, J. E., 'Changing Chungking,' *Geographical Review*, vol. xxix, p. 49 (New York, 1939).

1. Motor roads, 2. Narrow road and paths, 3. Streets and lanes, 4. Mean river shore line in winter.

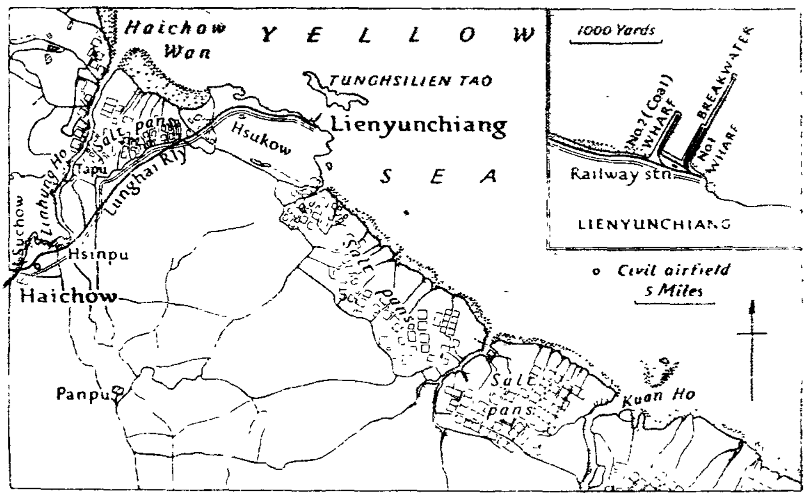


Fig. 74. Lienyunchiang (Laoyao)

issues identity cards to over 1,000,000 residents in the city and its neighbourhood, and administers the fire-brigade and arrangements for air-raid shelters.

The Public Health Bureau has established public health stations, clinics, and mobile health units. The city has no modern sanitation system, all sewage and garbage being dumped in the river, but there are four public hospitals and five private and mission hospitals providing adequate facilities for the sick and injured. The Food Administration Bureau is concerned mainly with the storing and sale of rice, while the Censorship Bureau controls the publication of all printed matter.

The Education Bureau, established in 1943, took over the control of educational matters in the municipality formerly entrusted to the Social Welfare Bureau. Since 1937, the removal of all centres of higher learning from occupied China has concentrated in Chungking no less than 20 universities, colleges, and technical schools, of which the most important are the National Central University (formerly at Nanking), the National Chiaotung University (formerly at Shanghai), the National University of Shantung (formerly at Tsingtao), Chunghwa University (removed from Wuchang), Futan University (removed from Shanghai), and the provincial Chungking University. There are a large number of public and private elementary and secondary schools as well.

The Public Works Bureau is in charge of parks, roads, lighting, ferries, vehicles, water supply, building construction, and the provision of air-raid shelters, of which there are sufficient in the city to accommodate about 426,000 persons. The destruction of large sections of the city by high explosive and incendiary bombs has given an opportunity for constructing wider and better roads and new business establishments. Chungking, like most Chinese cities, had narrow lanes and streets, which have now been largely replaced by a network of main and branch roads with pavements in the city and its outskirts. Motor-buses, rickshas, horse-drawn carriages, and sedan chairs give adequate transport facilities for the public. New ferry landings have been built, two new parks laid out, and many modern buildings constructed.

Electric light, heat, and power is provided by the Chungking Power Co., whose plant is situated on the right bank of the Kialing kiang, three miles north-west of the city. It was a private concern, first founded in 1915, but is now under the control of the municipal government; its three generating plants have a joint

capacity of nearly 10,000 kilowatts and alternating current is distributed through transformers at 220/320 volts. It supplies light to the city and suburbs and power to numerous factories; some of the larger industrial establishments, however, have their own power plants.

The waterworks, which first operated in 1932 as a private concern, draws water from the Kialing kiang into a reservoir; from there it passes through a series of settling tanks, filter beds and purification tanks, and finally into three large reservoirs. The pumps used in the plant are operated by power from the city power plant. The outflow of the waterworks in 1941 was approximately 630,000,000 gallons.

The Chungking Telephone Administration, which originated in 1926, passed from the control of the provincial government to that of the Ministry of Communications in 1938. Since then it has undergone considerable expansion; there are now 16 different exchanges, two of which in the old city and new municipal area are automatic systems with 1,500 and 1,800 lines respectively. The remaining exchanges on the magneto system have in all 1,070 lines. To reduce possibility of damage during air raids the majority of these lines are laid underground and the old city exchange is housed in a deep bomb-proof building. In 1943 the local and long-distance telephone systems and the telegraph systems were combined as the Chungking Telecommunications Administration (see p. 382).

Chungking, as the national capital, was the seat of all government departments and the residence of foreign ambassadors, consuls and their staffs. Organizations of all kinds, business firms, cultural associations, newspaper offices, foreign missions, naturally selected the city as their headquarters.

History

Chungking boasts a history of more than 4,000 years. It is the traditional birthplace of the consort of the emperor Yu of the legendary Hsia dynasty, and was the capital of a feudal kingdom in the Red Basin during the period of the 'Warring States.' The first city walls of any size were constructed about 250 B.C. when the town was named Chiangchow. The name of Pahsien, first used after the fifth or sixth century A.D., has again been adopted as the official name of the municipality. The name of Chungking dates only from 1188, in the period of the Sung dynasty. About 1370, at the beginning of the Ming period, solid stone walls similar in

extent to those existing in this century were built, and were slightly extended and rebuilt in 1664, and again in 1760–61. After the unification of China by the emperor Shih Hwang Ti in the third century B.C., Chungking and the country around it lost its independent character, although abortive attempts at independence were made in the periods of civil war at the end of the Yuan and Ming dynasties.

Chungking was opened as a treaty port in accordance with the Treaty of Peking between China and Great Britain in 1890. The Treaty of Shimonseki, which ended the Sino-Japanese war of 1894–1895, gave Japan the right to establish a concession in the city; the settlement, on the right bank of the river, was established in 1901 when the port was opened.

Chungking was made a municipality in 1923 by the provincial government of Szechwan, and on 20 November 1937 the National Government officially announced the temporary removal of the national capital to the city. In 1939 Chungking was elevated to the status of a special municipality under the direct control of the Executive Yuan, and in 1940 it was decreed one of two auxiliary capitals, the other being Sian (see vol. ii, p. 314).

Industries

Chungking, lying on the intersection of the Yangtze and the Kialing kiang and within easy reach of the Kialing and Nanchwan coalfields, is ideally fitted, from the point of view of transport and power facilities, for the location of manufacturing industries. Raw materials of many kinds are available, for the agricultural and mineral resources of Szechwan and neighbouring provinces are considerable. Difficulty of transport has in the past been the chief stumbling block, but the war-time expansion of lines of communications has helped in no small way.

A good basis for manufacturing development has already been laid by the transfer to Chungking of many manufacturing establishments from the eastern seaboard, in particular from the Yangtze delta, while the growth of the Industrial Co-operative movement has added a further stimulus (see p. 155).

The Ministry of Economic Affairs listed 451 privately owned factories of various kinds in the Chungking area by the end of 1941; there were in addition a number of larger state-owned industrial establishments under the control of the National Resources Commission. The most important heavy industry establishment located

in or near Chungking consisted of the most essential part of the Hanyehping iron works, formerly located at Hanyang; there are other iron and steel works also, both state owned and privately owned, of which the chief is the modern works at Tsitsikow, ten miles up the Kialing kiang. As many as 210 engineering works, mostly of small capacity, are listed, and turn out machinery of all types. To meet the needs of China's armies, several armament works have been established under state control. There are both state and private factories for the manufacture of electrical and radio goods of all types. An electrolytic copper refinery is also in operation at Chungking.

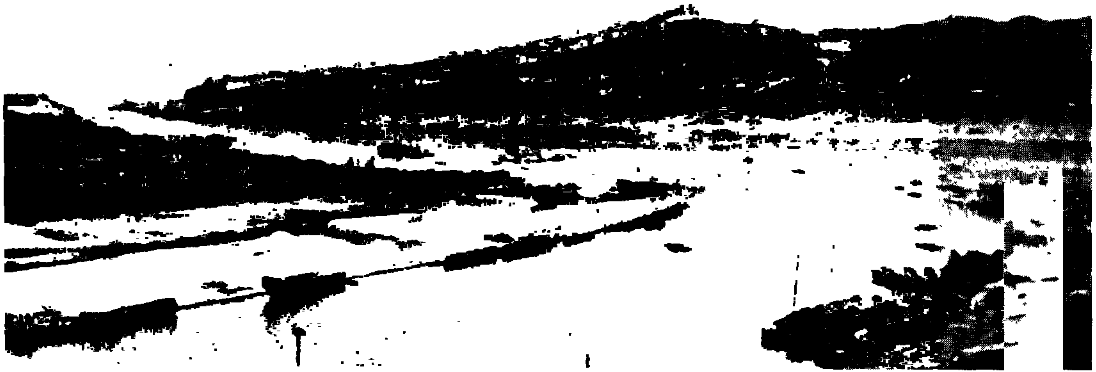
The chemical and allied industries are represented by soap and candle factories, acid and soda manufacturing plants, paper mills, tanneries, alcohol plants, a rubber reconditioning plant, oil refining plants, of which the Tung Lu Oil Works' vegetable oil cracking plant for the production of fuel oil and gasoline substitute from wood-oil is especially notable, the cement works at Malaochi, and match factories. There are also a number of factories manufacturing medical supplies of all kinds.

The textile industry is represented by five cotton spinning mills with a total of nearly 75,000 spindles, silk mills, and dyeing factories. Other industrial establishments include food processing factories of various kinds, printing presses, saw mills, and pottery works. Many of these are on a very small scale, as are the establishments under the control of the Chinese Industrial Co-operatives (see p. 152).

Trade

In 1936 the total tonnage of shipping, all in domestic trade, entered and cleared at Chungking was 542,312. The total value of the trade of the port was $91·3 million, of which domestic trade accounted for $88·9 million, a figure surpassed only by Shanghai and Hankow of the Yangtze ports. Almost all the foreign trade was in imports, the small quantity of exports consisting entirely of parcel traffic with Hong Kong. The bulk of the foreign imports was mineral oils, and of native imports cotton yarn. Wood-oil, pig bristles, sugar, tobacco, medicinal substances, silk, and goat skins are the leading exports.

Although the occupation of the lower and middle Yangtze areas by Japan severed Chungking's trade connexions with much of the eastern seaboard and large parts of China, the development of communications in western China and the city's new importance as the



Plates 93 and 94. Panoramic view of Chungking

Chungking harbour and city, during the winter low water season, when temporary buildings are set up on the steeply sloping banks (above). The junction with the Kialing kiang can also be seen with the suburb of Kiangpei in the background (below).

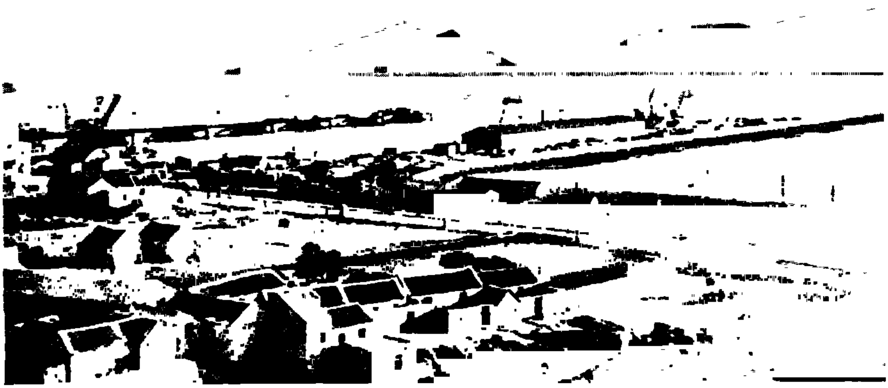


Plate 95. Lienyunchiang (Laoyao) harbour

The artificial harbour with Tunghsilien tao in the background. No. 1 wharf is on the right, No. 2 wharf on the left; the tower of the new railway station appears at left centre.

Plate 96. Tsingtao

A view of the southern part of the city with Horseshoe rock in Kiaochow wan in the background.

national capital led to a steady improvement in trade ; the value of foreign trade for January–September 1841 rose to \$11·5 million, nearly five times as much as was recorded for 1936.

Communications

In spite of extensive development of roads and airways, water routes are still of most importance to Chungking. Down river services run to Wanhsien, and in normal times to Ichang and other ports (see p. 534). Regular communication is also maintained with Sui, 134 miles up river on the Yangtze ; with Hochow, 52 miles up river on the Kialing kiang ; and with Kiating, 86 miles above Sui on the Min kiang ; shallow draught cargo junks ascend further up all three rivers.

In addition to the new road network in the city and suburbs, there has been extensive building of roads to link up the capital with all important parts of unoccupied China. Most of those roads are macadamized and kept in good repair and are extensively used by motor traffic. The Chungking–Chêngtu highway via Lungchang links up with the Chêngtu–Sian highway and gives connexion with centres in the north-west and ultimately the U.S.S.R. The Chungking–Kweiyang highway gives connexion with Nanning and French Indo-China, and with Kunming. Another highway runs more directly to Kunming via Luchow to link up with the Burma Road. There is no railway as yet, but surveys for lines to Chêngtu and Kunming have been largely completed, and construction on the Kunming-Sui section is well advanced.

Up to the opening of hostilities in 1937, Chungking was an important stopping place on the Shanghai–Chêngtu service of the C.N.A.C., which also operated a special Chungking–Hankow service. With transference of the capital to Chungking, the city by 1941 became a focus of air routes. C.N.A.C. operated services to Chêngtu, Kiating (via Sui), Calcutta (via Kunming and Dinjan), Rangoon (via Kunming and Lashio), Hanoi (via Kunming) ; the two latter services were suspended by 1942, but a new service to Lanchow was inaugurated in the same year. The Eurasia Aviation Corporation operated services to Hanoi and Hong Kong (both suspended by 1942), Kunming, Kweilin, Chêngtu, and Hami (via Lanchow and Urumtsi).

Seaplanes land and take off from the river at Suchipa in the high-water season, and at Kwangyuanpa, 11 miles below Chungking, in the low-water season. Landplanes use the military airfield at Kwang-

yuanpa and the civil airfield at Sanhupa; this field (half a mile above the city) floods at the 50 ft. level and is not used during high water.

The city is connected to the general telegraph system and has long-distance telephone communication with Chêngtu, Changsha, Kunming, Nanning, Sian, Lanchow, Foochow, and many cities of 'Free China.' To supplement the telephone service, radio-telephony is possible with many other centres, within and without China, but the services to Hong Kong, Rangoon, and Hanoi were suspended in 1939. As well as the military W/T station at Kwangyuanpa and the W/T station operated by the C.N.A.C., there is a series of stations near the broadcasting station 10 miles north-west of the city for communication with all parts of the world. The Central Broadcasting Station operates on short- and medium-wave for listeners in China, and on short-wave for listeners in Europe, America, and elsewhere (see p. 601).

For Bibliographical Note see pp. 427–8.

Chapter IX

THE PORTS OF NORTH CHINA[1]

Lienyunchiang (Laoyao): Tsingtao: Weihaiwei: Lungkow: Tientsin: Chinwangtao: Bibliographical Note.

LIENYUNCHIANG (LAOYAO)

Lat. 34° 43′ N., long. 119° 32′ E. Population, no data.
Admiralty chart 3480. Fig. 74. Plate 95

The artificial harbour of Lienyunchiang (Laoyao) is situated on the north-east coast of Kiangsu, about 40 miles south of the boundary with Shantung province. This site was selected by the Lunghai Railway Company as the terminal port for the railway which runs through a rich agricultural area with resources of coal, salt, and phosphates, to replace Tapu, the former terminus, which had become unusable owing to silting.

Approach and Access

The port has been constructed in a channel between the rocky island of Tunghsilien tao (Monli shan) and Taolin point on the mainland. The approach channel, which is from the east, has been dredged close to the south side of Tunghsilien tao; originally there were depths of 20–36 ft. in this channel, but by 1937 they were reported as not more than 18 ft., and in 1944 only 12 ft., owing to rapid silting.

The harbour is well sheltered by Tunghsilien tao, but somewhat exposed to east and south-east winds. The tidal streams through the channel run at rates of from 2–4 knots; tidal ranges vary from 10 ft. at neaps to 20 ft. at springs.

Detailed Description

Lienyunchiang port was built in the period 1933–36 by the Netherlands Harbour Works of Amsterdam, the task of construction was handicapped by continued collapses owing to the uncertain nature of the bottom, which is mainly soft mud.

[1] The port descriptions are largely those of the ports as they were in July 1937, before the outbreak of the Sino-Japanese war, though occasional references are made to later developments; conditions in many places must be radically different, especially with regard to port facilities and communications.

The artificial harbour consists of a single basin about 855 ft. wide, between a breakwater to the east and a wharf to the west, both extending north-east from the mainland. The breakwater, constructed on concrete blocks, is 3,445 ft. long, of which the inner 1,476 ft. is taken up by No. 1 wharf, which had a depth alongside of 20 ft. at low water; berthing for three vessels of 4,000–5,000 tons is available here. No. 2 (coal) wharf, on the western side of the basin, is similar to No. 1 wharf in size and accommodation, but is used exclusively by the Chunghsing Coal Co. for loading coal. The depth of the basin at low water was to be 18 ft., but rapid silting is in progress and soundings in 1937 showed depths of only 10–17 ft. alongside the wharves. Berthing is carried out by the Lunghai Railway Co., which has four tugs available.

In 1937, the Chinese destroyed the port facilities and blocked the harbour, but in December 1942 the Japanese began a programme of further development of the port mainly for the export of coal. Extensive dredging was undertaken and the construction of a new breakwater and a quay planned; a small jetty on the west side of the harbour was also built.

Port Facilities

No. 1 wharf has a small steel-framed godown, 33,161 ft. in extent and of 1,000 tons' capacity, equipped with three 3-ton electric buffing cranes; it was proposed in addition to instal two 2-ton Diesel electric mobile cranes and to build godowns the full length of the wharf equipped with overhead cranes and with stacking gear. At the base of this wharf there are three storage godowns, 193,750 square ft. in extent, with total accommodation for about 6,000 tons of cargo. No. 2 wharf has a coal-loading installation with a capacity of 400 tons per hour. Railway lines run along the length of both wharves; cargo is loaded and discharged directly from ships to railway trucks, but the shortage of suitable labour makes the handling of cargoes both slow and inefficient.

The Chunghsing Coal Co. has a coal yard for stocks of about 160,000 tons of coal from its mines at Tsaochwang, in southern Shantung; limited supplies of fuel oil and gasoline are available, but there is a marked scarcity of fresh provisions and water, especially for drinking. In addition to the railway company's tugs, a number of coal lighters are normally stationed at the port. The administration of the port is in the hands of the Lunghai Railway Co., which is greatly hindered by its unfamiliarity with port problems.

The Town

Prior to the building of the artificial harbour the small village of Laoyao was the only settlement in the neighbourhood. The new town, still in course of development, occupies a site partly excavated out of the north side of the hill mass of Chienyuntsi shan, and partly reclaimed from the foreshore. Here there are numerous new stone buildings including shops, offices, and stores, the dwelling houses of officials and workers, two hotels, two small hospitals, and a large railway station of modern design, built by the Lunghai Railway Co., to house in addition the customs and harbour authorities. The railway company has also built a small electric power station, but the port has been supplied with electric light from Haichow. Lienyunchiang is not very healthy, being hot and oppressive in summer; sanitation arrangements are very primitive, but the construction of a waterworks at Hwangwo nearby has been planned.

Development of the town has on the whole been slow owing to the problematic future of the port, handicapped as it is by excessive silting, shortage of labour, and lack of adequate water supplies.

Lienyunchiang is administered by 'The Preparatory Office for the Establishment of the Lienyu Municipality,' which has its seat at Haichow, but the Lunghai Railway controls a railway zone, running parallel to the shore for a depth of half a mile. It is intended that the new municipality will eventually absorb the railway port organization.

Trade

No separate statistics as to the nature and volume of trade at Lienyunchiang are normally issued by the Maritime Customs, as the port is included in the Tsingtao customs district (see p. 392). It was, however, stated in 1936 that a total tonnage of 928,764 entered and cleared at Lienyunchiang, all under the Chinese flag; there were also a considerable number of junks using the port. The value of imports was given as \$22·6 million, mainly metals, sugar, paper, cotton cloth, dyes, cement, and rice. The chief features of the exports were greatly increased shipments of coal to Japan and of rice to domestic ports; foreign trade was mainly with Japan, domestic trade chiefly with Shanghai and Tsingtao. The Chunghsing Mining Co., the China Merchants' S.N. Co., the Shanghai S.S. Co., and the China United S.S. Co. ran to the port, and did so at a loss owing

to shortage of labour and slowness in handling cargo. The Chunghsing Mining Co., however, was in a better position since it has its own ships, rolling stock, and staff, and was not so dependent on the poor facilities offered by the Lunghai Railway Co. Since the Japanese occupation in 1938, trade with Japan has greatly expanded, and cargo services run regularly to Japanese ports. Coal, salt, phosphates, iron ore, wheat, and millet have been exported in considerable quantities. The coal, from mines of the Tsaochwang group, has been used by the iron and steel industry of Yawata in Kyushu, as it is of good coking quality.

Communications

In 1934, the standard-gauge single-track Lunghai Railway was extended from Tapu to Lienyunchiang, which is thus normally in direct rail communication with places as far west as Sian, a distance of 643 miles. There is an extensive network of canals and rivers in the area of which the Linhung ho and Kuan ho are the most useful; these are used mainly for barge transport of salt, and accessible only to shallow draught vessels (Plate 140).

There are a number of earth-surfaced roads in the area and further construction was projected. These are in fair condition but deteriorate quickly after heavy rains or an increase of motor traffic. The most important runs inland from the port to Haichow via Hsinpu, and is used by a motor-bus service for part of the way.

The nearest civil airfield is at Haichow, which was used up to 1937 by the C.N.A.C. on the Shanghai–Peiping service. The Salt Gabelle has a system of private telephone lines to the salt pan areas; there is telephone connexion between Lienyunchiang and the telegraph office at Hsinpu. There were W/T stations at Panpu and Hsukow.

TSINGTAO

Lat. 36° 04′ N., long. 120° 19′ E.	Population (1936), 514,769.
Admiralty chart 857.	Fig. 75. Plates 50, 96, 97.

Tsingtao, situated at the entrance to Kiaochow wan, is about 400 miles by sea north of Shanghai. Its fine harbour has made it an important trading centre not only for Shantung, but for much of North China, but it is handicapped to some extent by its distance

from its hinterland and the competition of Tientsin. It is also a fishing centre of considerable importance.

Approach and Access

The approach to Kiaochow wan from the eastward is between the rocky coast of the Shantung peninsula on the north and isolated islands and shallow bank to the south. The outer harbour, which lies in the entrance to the bay between Haihsi peninsula and the mainland to the north is mostly over 10 fm. deep, but is used mainly as a quarantine station. The bottom, of soft mud and sand, affords good holding ground; the Outer harbour is exposed to the southerly winds of summer when a sea gets up, but is sheltered from winter winds. The Inner harbour, lying immediately west of the Outer harbour and extending north-eastward, is sheltered from southerly but exposed to north-east winds which often raise a strong sea. The main channel to the Great harbour, which has a least depth of about 5 fm., lies westward and north-westward of Horsehoe rock, a rocky shoal about half a mile west of Small harbour; there is also a narrow channel, with least depth 4 fm. in the fairway, between Horseshoe rock and the mainland.

At Tsingtao the height of mean high-water springs is 12½ ft., and of mean high-water neaps 9¾ ft.; tidal streams both in and out of the entrance run at one to two knots, though rates of up to 4 knots have been experienced.

Kiaochow wan is partially frozen over during severe winters, but the ice is never thick enough to obstruct large vessels, though some inconvenience may be caused to junks and small craft.

Detailed Description

There are two artificial harbours in the Inner harbour situated on the western side of the peninsula, on which the city stands. The southernmost of these, known as the Small or Boat harbour, which is protected by two breakwaters, is dredged to a depth of 16 ft. over the southern portion. This harbour is mainly used by junks and small steamers, has a bund and contains a pier with rail connexion to the railway system; the Tsingtao Government Dry Dock is situated on the west side of this harbour. The Great harbour is formed by a horseshoe-shaped breakwater extending from the coast about 1¼ miles north-east of the Small harbour, and is mostly dredged to a depth of 30 ft. The following wharves are available for shipping in the Great harbour:

Wharf	Length of frontage	Depths at L.W.O.S.T.	Remarks
	ft.	ft.	
No. 1 Mole	2,513	16–29	For general cargo and coal; used by coasters.
No. 2 Mole	3,645	24–29½	For general cargo; used by Japanese mail lines.
No. 3 Mole	3,740	31–37½	For bulk cargo, lumber, and coal; used by cargo vessels.
No. 4 Mole	558	24	For petroleum and explosives; used by oil tankers.
No. 5 Mole	3,856	23	For coal and salt; used by various shipping.

Moles Nos. 1–4 run parallel to one another at distances of about 480 ft. apart, from the east side. Mole No. 5, which has a small pier at about the centre, is at the tip of the breakwater on the west side of the harbour. A concrete pier 423 ft. long and 20 ft. wide extends southward from the middle of Tsingtao wan; there is a depth of 7 ft. alongside at the steps at the end of the pier. Another pier extends westward from the coast about half a mile south-west of the Small harbour; it is used mainly by warships' boats.

Port Facilities

There are a few mooring buoys in the Great harbour, but vessels invariably berth alongside the wharves discharging and loading cargo to and from railway trucks. There are 10 berths at mole No. 5, 8 berths each at moles Nos. 2 and 3, 7 berths at mole No. 1, and 1 berth at mole No. 4. The wharves are equipped with 41 hydrants, which use water supplied by the city waterworks.

Moles Nos. 1 and 2 have godown storage space to the extent of 16,087 and 16,336 square yds. respectively, but there is ample storage space in the port area for cargo of all kinds.

For handling large loads, as well as a 150-ton stationary electric crane at wharf No. 5 there are two floating cranes of 30 and 22 tons' capacity respectively, and a truck crane for lifts of up to 10 tons. Very large stocks of coal up to 245,000 tons are maintained, usually for the Poshan and Tzuchuan mines; bunkering is carried out alongside wharves by baskets. The oil companies carry fairly large stocks of fuel oil in drums, and have kerosine and gasoline storage as follows (number of tanks indicated in brackets):

	Kerosine	Gasoline
	tons	tons
A.P.C. ..	(3) 2,450	(1) 2,200
	(2) 100	(1) 140
S.O.C.O.N.Y.	(2) 5,300	(1) 1,500
	(1) 1,800	(1) 120
Texas Co. ..	(1) 3,750	(1) 2,000
	(1) 900	

All three installations are connected to the pipe line on wharf No. 14. In 1939, the Japanese were in course of constructing a fuel oil and gasoline installation for the use of their navy, near the A.P.C. and S.O.C.O.N.Y. installations, close by wharf No. 4

Water of good quality may be taken from the hydrants at the wharves and from water boats ; ships' stores and provisions of all kinds may be had in reasonable quantities.

The dry dock on the west side of the Small harbour can accommodate vessels of 6,000 tons' displacement, and has the following dimensions :

Length (from caisson to head of dock), 480 ft.
Width at top, 75 ft. ; at bottom, 59 ft.
Depth on sill at H.W.O.S.T., 24 ft. 8 in.

The dock is equipped with a sheerlegs to lift 7 tons and a crane to lift 5 tons. There are three slipways owned by the harbour authorities :

No. 1 for vessels up to 140 ft. long ; lifting capacity, 400 tons.
No. 2 for vessels up to 80 ft. long ; lifting capacity, 100 tons.
No. 3 for vessels up to 60 ft. long ; lifting capacity, 50 tons.

There is a naval dockyard adjoining the dry dock, with foundry, machine shops, welding plants, and all the necessary equipment to deal with minor repairs ; various local firms also undertake small repairs. Considerable damage was done to the dock and dockyard by the Chinese before evacuating the port in 1937. The Japanese have now taken them over for the use of their navy and maintain salvage facilities in addition. The normal harbour craft facilities consist of three tugs, none of which are very powerful, and a few lighters for handling explosives, together with many small junks and sampans. The port is administered by the Tsingtao Harbour

and Wharf Administration which is under the control of the municipality. Prior to 1938, an ambitious programme of improvements was planned to increase the freight handling capacity of Tsingtao. When the Japanese occupied the port in 1938, they took in hand their own project to improve the harbour and to make it a first-class naval base for the Japanese fleet.

History

The most important settlement in the Tsingtao area was the old native city of Kiaochow, about 5 miles from the sea to the north-west of the bay; the site of Tsingtao was then occupied by a small dilapidated fishing village, though the Chinese built a fort and established a small naval station there in 1891. In 1897, two German missionaries were murdered at Yenchow in south-western Shantung. Germany, anxious to acquire a base in Chinese waters and a share in the carving up of China, sent a naval force to Tsingtao and occupied the naval station. In addition to money compensation and the dismissal of the provincial governor, Germany secured a 99-year lease of the waters of Kiaochow wan and territory round about (vol. ii, Fig. 3) in 1898. She also obtained the right to build a railway to Tsinan, the capital of Shantung, and certain mining rights and economic privileges in the province. Within a few years the Germans had developed the area with characteristic thoroughness and created a new and important port.

After the declaration of war by Japan on Germany on 23 August 1914, Japanese forces, aided by a small British contingent, blockaded and invested Tsingtao, which capitulated on 7 November. In spite of repeated protests by China, Japan continued to occupy the former leased territory and various strategic points throughout Shantung, even after China had herself declared war on Germany. The matter was eventually settled after the Washington Conference (1921–22), and Japan restored the leased territory and the rights formerly held by Germany in December 1922. Tsingtao came under the control of the National Government in April 1929, and was almost immediately constituted a special municipality. The outbreak of hostilities between Japan and China in 1937 put Tsingtao at the mercy of the Japanese, who occupied the port in January 1938.

The Town

Tsingtao was laid out in modern fashion by the Germans, with many well-constructed buildings and wide well-surfaced streets and

roads, many lined by trees. Further development on similar lines was undertaken by the Japanese between 1914 and 1922, and since then by the Chinese municipality. It is thus distinct from the other seaport cities of China by reason of its European rather than Chinese appearance. The special municipality has an area of about 212 square miles and is administered by a mayor and various bureaux in charge of the different municipal activities, which include a police force of about 3,000, fire brigade, education and public health.

The administrative quarter is in the southern part of the city along the shores of Tsingtao wan; here there are various government offices, banks, and other commercial buildings, schools, churches, hotels, hospitals, and the Japanese university. Many of the foreign residents live here, and also farther to the south-east along Augusta Victoria and Iltis bays, where there are fine bathing beaches which attract many summer visitors. The racecourse, golf links, recreation ground, and tourist hotels are also situated in this part of the city.

North of the administrative quarter is the new town built by the Japanese after 1914, and the commercial section of the city occupied mainly by Chinese and Japanese merchants. To the north-west, adjacent to the port and railway, is the industrial and shipping centre.

The climate of Tsingtao is healthy and bracing, and there is a modern sanitation system; there are two well-equipped large hospitals, one of which is under Japanese control, and several smaller hospitals. The Tsingtao waterworks are situated at a small village on the Litsun ho, about six miles north-west of the port. An underground pipe line supplies the city, and a reservoir on the peninsula to the south-east; there are in addition numerous wells in the city. Electric light and power is supplied by the Kiao Ao Electric Light Co., whose plant is situated to the east of the main railway station. Many of the industrial establishments have their own plants.

Industries

Considerable industrial development has taken place in Tsingtao, which is the chief town of the industrial area of eastern Shantung. The cotton industry is the most important, Tsingtao ranking second to Shanghai in this respect. There are 10 cotton mills, 9 of which are Japanese-owned, with a total of 620,650 spindles and 9,161 looms. Other industrial concerns include match factories, a brewery, tobacco factories, an ice-making plant, machine and engineering works, a rubber factory, a locomotive and carriage works, railway repair

shops and lumber yards, printing works, chemical and dye works. Tsingtao is also one of the important centres of the sea-salt industry.

Trade

In 1936, a total of 7,536,206 tons of shipping entered and cleared at Tsingtao, of which about 5,590 was in domestic trade (over 30,000 junks also enter and clear annually). The total value of the trade of the port was $235·6 million, of which rather more than half was domestic trade. In value of foreign trade Tsingtao was surpassed only by Shanghai and Tientsin, though a larger tonnage was recorded by Swatow and Canton. Up to 1936, Tsingtao was steadily increasing its tonnage of shipping at the expense of Tientsin, as the following figures show:

Tonnage of Entrances and Clearances at Tientsin and Tsingtao, 1932–36

Year	Tsingtao	Tientsin
1932	6,098,307	5,740,161
1933	6,559,820	6,167,684
1934	6,938,401	5,998,091
1935	7,221,836	5,797,300
1936	7,536,206	5,165,247

Tsingtao's fine harbour offsets the disadvantage of being further removed than Tientsin from the chief production centres of North China.

In 1936, the import trade of Tsingtao, as of the North China ports in general, was adversely affected by wholesale smuggling, with Japanese approval, through eastern Hopeh. The leading imports in that year were vehicles, machinery, tools and metals, followed by raw cotton, sugar, artificial silk yarn and piece-goods, timber, cereals, mainly rice, and flour, and kerosine. The leading export was groundnuts and groundnut oil, exported in bulk in tanks carried by ocean-going vessels; other exports included raw cotton and cotton yarn, leaf tobacco, eggs and egg products, meat, coal, millet, and salt.

Fully half the imports came from the Japanese Empire; Great Britain, U.S.A., Netherlands East Indies, and Belgium ranked next in importance. About half the exports also went to the Japanese Empire, the bulk of the remainder to U.S.A., Great Britain, Hong Kong, the Netherlands, and Germany.

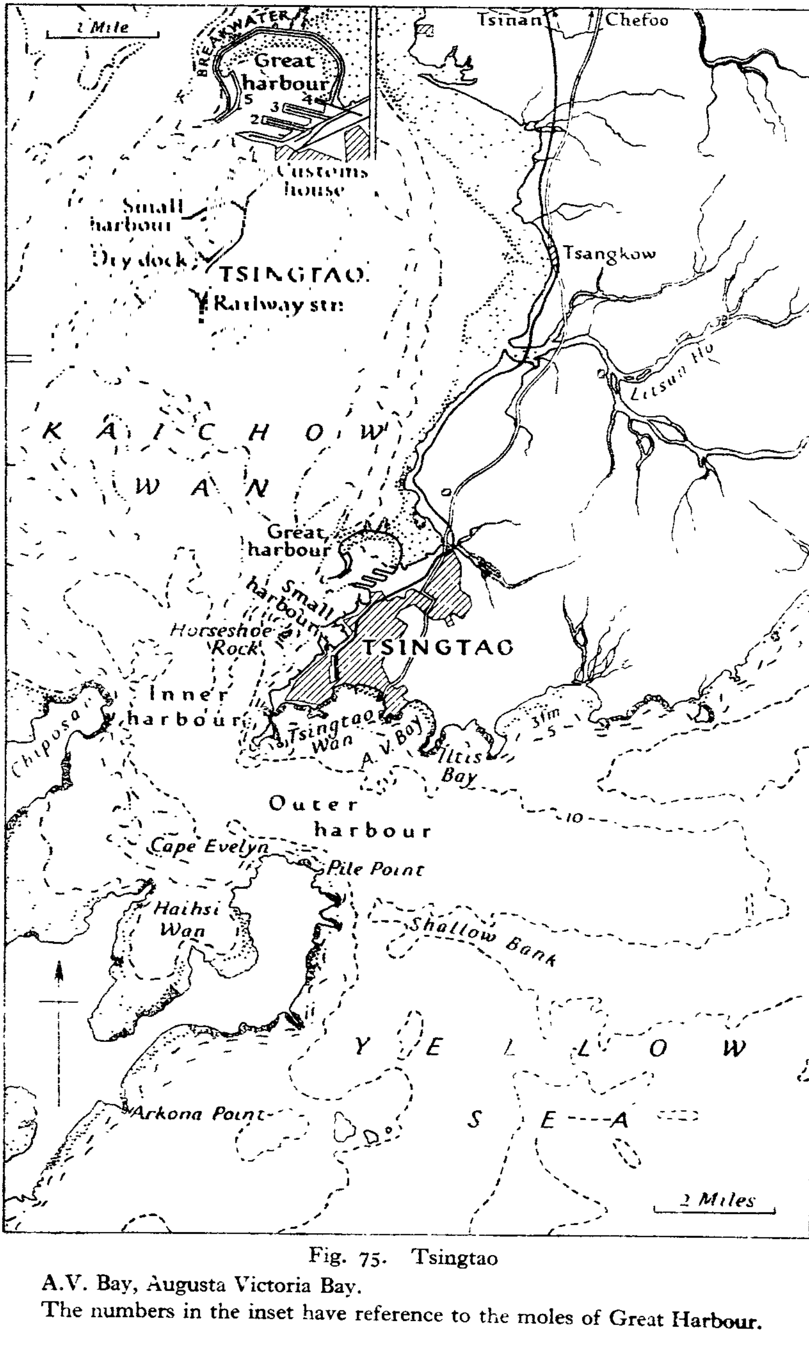


Fig. 75. Tsingtao

A.V. Bay, Augusta Victoria Bay.

The numbers in the inset have reference to the moles of Great Harbour.

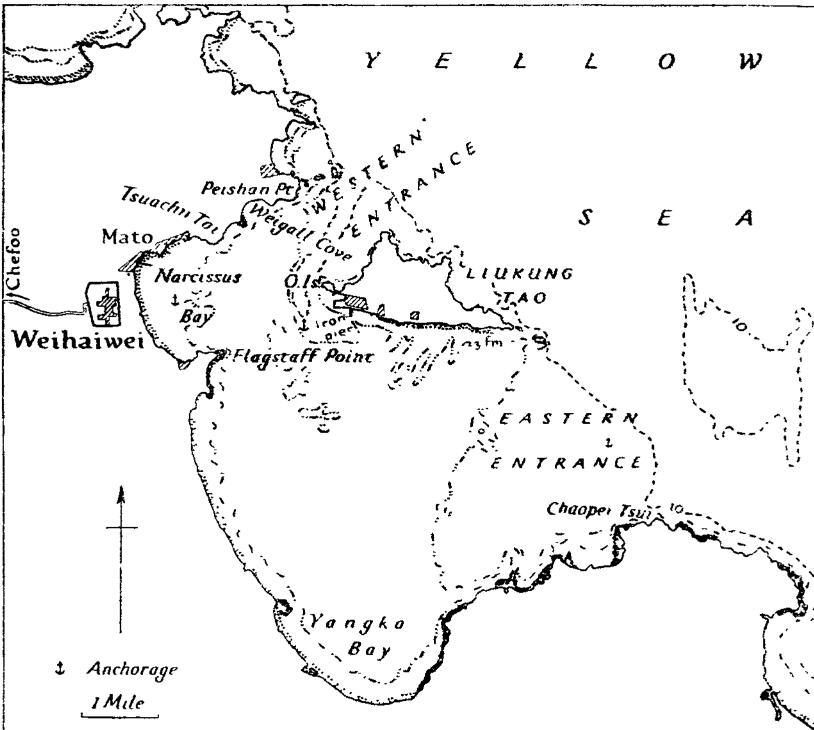


Fig. 76. Weihaiwei
O. Is., Observatory Island.

Since 1938, Japan has paid considerable attention to Tsingtao, and its trade by 1941 had shown considerable expansion, due almost entirely to increased trade with Japan. Statistics of foreign trade for the period were as follows :

Foreign Trade, Tsingtao, 1937–41
(*millions of dollars*)

1937	107·9
1938	78·4
1939	177·0
1940	322·2
1941 (Jan. Sept.)	270·6

Communications

There are no inland waterways in the Tsingtao district, but there is regular coastal steamer and junk traffic with minor ports along the coasts of Shantung and Kiangsu. The only important road, which is in good condition, runs north to Chefoo, but there are good metalled roads in the area adjacent to the port. Motor-bus services operate to Chefoo and in the city and suburbs. The standard-gauge single-track Kiaotsi Railway runs from Tsingtao to Tsinan, a distance of 244 miles, and is the chief means of communication with the hinterland of the port. The line was constructed by the Germans in 1904 and has since maintained a high standard of efficiency.

Tsingtao is connected to the main telegraph system and has long-distance telephone communication with Tsinan and other centres. Submarine cables run to Shanghai and Tientsin via Chefoo, and to Sasebo in Japan. There is a commercial W/T station which was controlled by the Ministry of Communication and also a Japanese military W/T station. The local telephone service was operated by the Ministry of Communications.

C.N.A.C. landplanes called regularly at Tsingtao on the Shanghai–Peiping service ; the airfield at Tsangkow, about 6 miles north-east of the town, is liable to flooding after heavy rains.

Weihaiwei

Lat. 37° 31′ N., long. 122° 09′ E.
Admiralty charts 2823, 3025.

Population of administrative area (1937), 222,247.
Fig. 76. Plate 98.

Weihaiwei is situated on the north coast of the Shantung peninsula, some 32 miles west of North-east promontory, in a large bay sheltered from seaward by the island of Liukung tao. Weihaiwei

serves as a port of call for coasting steamers plying between Shanghai and Tientsin, and suffers like Chefoo from a poor hinterland, inadequate communications, and the competition of Tsingtao.

Approach and Access

Weihaiwei is approached through two entrances. The Western entrance, leading north-west of Liukung tao, between that island and Peishan point on the mainland, is about one mile wide, and can be used safely by the largest vessels. The Eastern entrance, extending south of Liukung tao to Chaopei tsui, has a least depth of 18 ft. and is navigable by ships of 16 ft. draught at any state of the tide.

At Weihaiwei the tidal rises are $6\frac{1}{4}$ ft. at springs and $5\frac{1}{4}$ ft. at neaps, but long-continued northerly and north-westerly gales may lower tide levels by as much as $5\frac{1}{2}$ ft. Tidal streams are complex, generally following the direction of the coast at a rate of $1\frac{1}{4}$ knots.

Typhoons are rare, but there are often line squalls in summer and strong northerly gales in winter, which make anchorage difficult in the Western entrance. At times, even in summer, an appreciable swell sets into the harbour, particularly through the Eastern entrance from easterly winds. Though winters are cold the port is invariably free from ice.

Detailed Description

In Weihaiwei there is no wharf accommodation and all vessels moor to their own anchors. Large vessels can anchor south-west of Liukung tao, where the holding ground is good in 31 ft. Anywhere south of the island vessels of not more than 16 ft. draught can anchor; off Iron pier there are three mooring buoys. In Narcissus bay there is a large junk anchorage also used by local steamers with depths of 12–18 ft. Anchorage is prohibited in a zone extending from Observatory island north-west to the mainland at Tsuachii tai (King Hall point), but there are anchorages south of this zone for light draught vessels in depths of 21–23 ft., and north of it, off Weigall cove, for larger vessels in depths of 27–33 ft. Anchorage is also prohibited in the fairway through the Western entrance, as defined by the white sector of the light on Flagstaff point, the southern extremity of Narcissus bay. The warship anchorage is in the Eastern entrance north of Chaopei tsui in depths of 8–11 fm., but here anchorage is also prohibited in the sector of white light from Flagstaff point lighthouse.

On the mainland shore of Narcissus bay there are two stone jetties, one off Mato (Port Edward), and Victory pier farther to the south opposite the Customs house, both suitable only for small craft; there is also a small stone jetty in Weigall cove. Off the south-west corner of Liukung tao is Iron pier, with a least depth of 19 ft. alongside, but too short to accommodate anything bigger than a tug. A short distance to the east of Iron pier are two stone jetties, Canteen steps and Clarke's (Cowan) pier, suitable for small boats. Military pier, still farther east, is in ruins and dangerous to approach.

Port Facilities

Fuel oil is not available, but the Kailan Mining Administration keeps a small stock of about 500 tons of bunkering coal. Water and fresh provisions can be obtained, but there are no facilities for making repairs to ships or for storing large quantities of merchandise. There are a number of wooden lighters and small craft, by means of which the merchant vessels using Weihaiwei can discharge and load cargo at the jetties.

The Town and the Leased Territory

Weihaiwei itself is a small walled town of not more than 2,000 inhabitants on the west side of Narcissus bay; much of the wall is in ruins, and two of the four town gates have been pulled down. Mato (Port Edward), formerly a small village, has grown to a thriving town of about 20,000 inhabitants; here there are modern buildings and the residences of the small foreign population.

In 1898, the district was poverty-stricken and the port had little trade, but during the thirty years of British rule the Leased Territory flourished, free from the disturbances prevalent in North China during the first part of the twentieth century.

Until 1916–17, yearly grants-in-aid were signed to the Leased Territory by the British government, but in that year revenue exceeded expenditure for the first time, and Weihaiwei was practically self-supporting from 1921 to 1930. The administration was thus always handicapped by shortage of funds and was unable to develop the territory fully. In spite of this the population rose from 147,177 (1911 census) to an estimated 175,000 in 1928, while in 1940 the population of the Administrative Area was 222,247, according to official Chinese sources. Since at least three-fifths of the area consists of uncultivated and almost uninhabited hill lands and sandy wastes, the density of population in the culti-

vated areas is about 1,300 persons per square mile, a figure which reflects the intensity of farming and settlement.

Weihaiwei, like Chefoo and Chinwangtao, enjoys a dry climate and has been a favourite summer resort for Europeans, especially from Shanghai; it was also the summer base for the British China fleet, as the naval buildings on Liukung tao testify.

At Mato there is a small electricity plant providing light for the commercial and modern residential quarter.

History

Weihaiwei was a fortified naval station of the Chinese navy before 1895, when it was captured by the Japanese after a naval victory. In 1898, following the Russian seizure of Port Arthur and Dairen, the British government obtained a lease of Weihaiwei and 285 square miles of surrounding territory 'for as long a period as Port Arthur shall remain in the occupation of Russia' (see vol. ii, p. 55). After a short period of administration by naval and military officers the Leased Territory was transferred to the Colonial Office and administered by a commissioner with powers similar to those of a governor of a Crown Colony.

In addition to the Leased Territory there was a much larger area of about 1,500 square miles in which Great Britain exercised certain military privileges, although the civil administration remained in Chinese hands; the town of Weihaiwei itself also remained under Chinese jurisdiction (vol. ii, Fig. 3).

After the Washington Conference of 1921, Great Britain offered to restore the Leased Territory to China, but although the Rendition Convention was ready for signature in 1924, the actual rendition did not take place until 1930, pending the establishment of a settled government in China. Accordingly, in October 1930, the National Government regained the Leased Territory for China, though allowing Great Britain certain naval privileges for a further period of ten years. As the Weihaiwei Administrative Area, the Leased Territory was controlled by a high commissioner directly responsible to the Executive Yuan.

Agriculture and Industries

The Leased Territory is primarily an agricultural region, hence there has been little in the way of industrial development. The census of 1921 showed that only 20 per cent. of the males over nine years of age were employed in industry and commerce; $8\frac{1}{2}$ per cent.

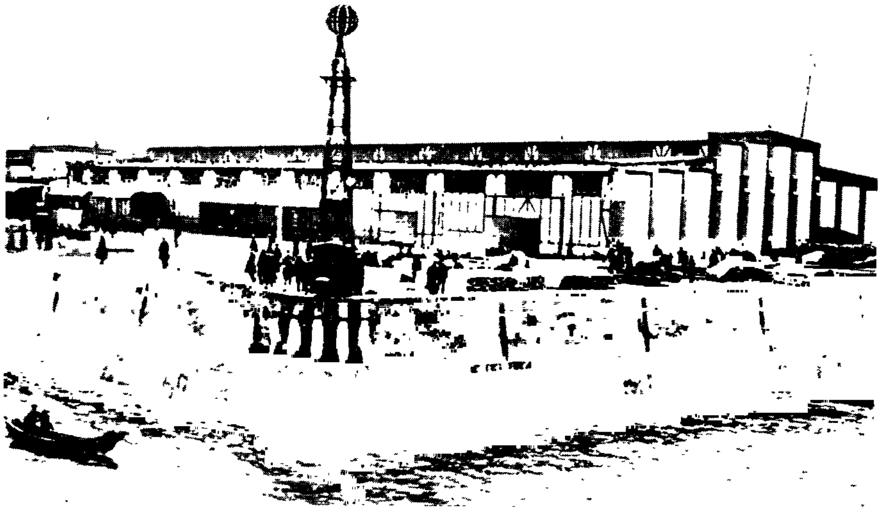


Plate 97. Wharf, Tsingtao
One of the wharves in Great harbour, Tsingtao.

Plate 98. Weihaiwei
The walled town of Weihaiwei, Narcissus bay and Liukung tao in the distance.

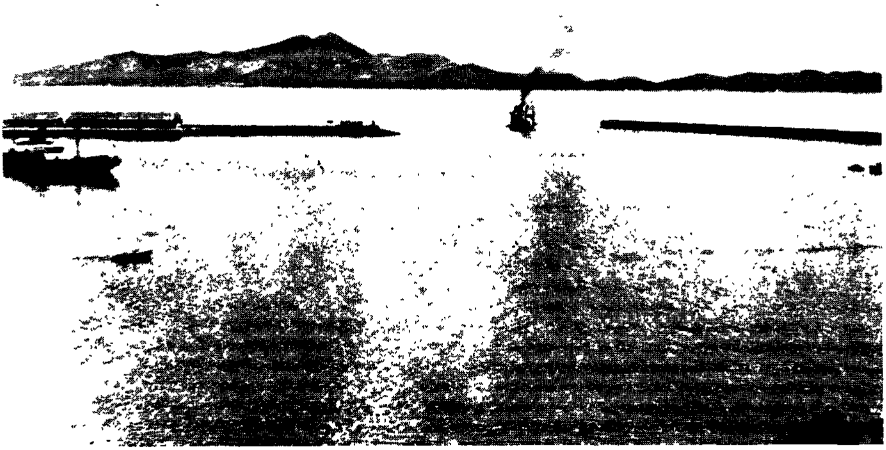


Plate 99. Inner harbour, Chefoo

A vessel leaving the Inner harbour ; ' Mole Wharf ' is on the right, the breakwater on the left, and Chefoo bluff in the background.

Plate 100. Chefoo harbour, 1936

In early 1936 severe frosts caused serious icing in the ports of the Gulf of Pohai.

in mercantile pursuits and commerce, 6½ per cent. in the building trade, 4 per cent. in transport, and 1 per cent. in textile trades. Furthermore, many of these were also engaged in tilling their own small plots of land.

The farmers of Weihaiwei are small peasant proprietors who make the best possible use of their land in the characteristically Chinese fashion; groundnuts ranks as the leading crop, but wheat, millet, barley, maize, kaoling, beans, sweet potatoes and vegetables are also grown, with a little cotton. The British administration introduced several kinds of European fruit trees and tried to encourage fruit-growing; later the Chinese authorities set up a model fruit farm, and by 1936 it was estimated that there were about 700 acres under fruit cultivation.

Large tracts of the hill country are covered with scrub oak (*Quercus serrata*), whose leaves are used in feeding the wild silkworm. Silk-weaving exists as a cottage industry and a few silk-filatures were established, but most of the raw silk was sent to Chefoo for manufacture into pongee. The silk hosiery industry, however, has met with considerable success, while the manufacture of hair-nets, lace, and embroidery has also been prosperous.

Sea fishing has long been profitable at Weihaiwei, one of the major fishing centres of Shantung, and a number of motor trawlers (156 in 1936) have been employed in the industry (see p. 77). The export of both fresh and salt fish is considerable. An ice-making plant is in operation to provide ice for the storage and preservation of the catch.

There are a considerable number of salt-pans in the coastal lagoons. The salt-pan area of the Leased Territory, which had a coastline of 70 miles, increased from about 30 acres in 1902 to nearly 1,000 acres in 1927; fully 70 per cent. of the salt produced is available for export.

In 1904, a company was formed to exploit the small gold resources of the Territory, but it went into liquidation in 1906 and the attempt to extract gold in paying quantities was abandoned as hopeless.

Trade

In 1902, the first year for which shipping records were kept, the gross tonnage of steamers entering Weihaiwei was only 151,809 tons, but under British occupation the port grew steadily in importance and the Maritime Customs figures for 1936 showed that the total gross tonnage of shipping entered and cleared was 2,772,870, of

which about 80 per cent. was in domestic trade. The total value of the trade of Weihaiwei in the same year was \$10·6 million, of which domestic trade accounted for \$7·1 million.

By far the most important item in the foreign trade is groundnuts, which generally account for about 90 per cent. of the exports; the chief imports were cotton goods, cereals (mainly rice), fertilizers, fuels (especially kerosine), timber, and sugar. Over seven-eighths of the foreign imports originated in the Japanese Empire. The Netherlands, Canada, Hong Kong, and Germany received the bulk of the exports.

Since 1937 the trade of Weihaiwei in common with other North China ports has shown some improvement, due mainly to increased trade with Japan, whose share in the foreign trade jumped to about 75 per cent.

Communications

The development of Weihaiwei has been severely handicapped by the absence of railways. Inside the Territory about 50 miles of stone-surfaced roads, properly bridged, were constructed during the period of British occupation, and still remain in fair condition. Elsewhere the dirt-surface roads deteriorate rapidly after the heavy rains of summer, and are inadequately bridged. The most important road is that running west to Chefoo, linking up with the important Chefoo–Weihsien highway; others run south to Wenteng and Shihtao, and east to Yungcheng and Litao. Daily motor-bus services are in operation to all these places except Wenteng, but are occasionally suspended when the roads are rendered impassable by heavy rains.

A submarine cable runs from Weihaiwei to Chefoo, and a telephone cable from Liukung tao to the mainland at Mato, both of which are under the Chinese Government Telegraph Administration; there was no W/T station.

CHEFOO

Lat. 37° 33′ N., long. 121° 24′ E.
Admiralty chart 1260.

Population of special area (1933), *c.* 230,000.
Fig. 77. Plates 99, 100.

The port of Chefoo is situated on the south side of Village bay, midway along the northern coast of the Shantung peninsula. The Chinese name for the port is Yentai, Chefoo proper being a small

village and an important fishing centre on the north side of Village bay. The effective hinterland of Chefoo covers an area of about 3,000 square miles, with a population of about 3,000,000, most of whom are peasants with a low purchasing power. Inadequate communications and the competition of the major port of Tsingtao further militate against any advance of Chefoo from the status of an important port of call on the sea route from Shanghai to Tientsin and Manchuria.

Approach and Access

Vessels proceeding to Chefoo use one of two entrances. The northern entrance between Sentry rock, off Chefoo cape, and the shoal extending south-west of Ku tao, has a least depth of 9 fm.; the southern entrance between Kungtung tao spit and Knob point has a least depth of 4·5 fm. Vessels of deep draught using the northern entrance can anchor south-west of Ku tao in depths of 6–7 fm., but this anchorage is open to winter gales. Smaller vessels anchor in Village bay, where there is little shelter to the east. In the northern part of Village bay, Chefoo bluff, a rocky ridge some 4 miles long, rising to about 1,000 ft. in height, gives shelter from north-west gales, but in the southern part these gales, blowing across the low sandy isthmus connecting Chefoo bluff to the mainland, may disturb vessels considerably.

The sea bed is of mud, fine sand, and gravel, and provides good holding ground everywhere. Anchorage is prohibited south of a line from Tower point to Kungtung tao owing to submarine cables.

In common with other ports in the Gulf of Pohai, tides at Chefoo are irregular, especially at neaps; this is due partly to a marked diurnal inequality and partly to tidal wave reflections from the shores and the wind. The tidal rise at M.H.W.S. is $8\frac{1}{2}$ ft., and at M.H.W.N. $1\frac{3}{4}$ ft.

The most notable weather hazards at Chefoo are violent northerly gales in winter, and on rare occasions typhoons in late summer. There are severe winter frosts, but the port is rarely ice-bound, though in 1936 shipping was at a standstill for 36 days (Plate 100).

Detailed Descriptions

The Inner harbour at Chefoo has been constructed on the west side of the rocky promontory of Tower hill, at the southern extremity of Village bay. It comprises a single basin enclosed by a mole

5,873 ft. long, and a detached breakwater 2,600 ft. long. There are two entrances to the Inner harbour, one at either end of the detached breakwater. The northern entrance is 755 ft. wide and the southern entrance, which is for emergency use and for junks, is 830 ft. wide; both entrances are dredged to a depth of 20 ft. At the end of the mole is 'Mole Wharf,' a concrete blockwork quay, on the west side of the northern entrance; this quay has a frontage of 600 ft., with a depth of 25 ft. alongside at L.W.O.S.T. Immediately inside the southern part of the breakwater an area of about 10 acres is kept dredged to a depth of 25 ft.; here there are two mooring buoys for vessels up to 480 ft. in length moored head to stern. Fifteen additional mooring berths are available in the Inner harbour, Nos. 1–9 for vessels 320 ft. long, Nos. 10, 12, and 14 for vessels 260 ft. long, and Nos. 11, 15, and 16 for launches and small craft. About 100 acres in the northern part of the harbour is kept dredged to a depth of 20 ft. at L.W.O.S.T. The shallower southern portion with a depth of 5 ft. serves as a junk and lighter anchorage, and is generally overcrowded with small craft.

In addition to 'Mole Wharf' there are:

	Frontage	Depth off end at L.W.O.S.T.
	ft.	ft.
Inner harbour		
Kaiping jetty	300	5
Fergusson's jetty ..	90	3
Customs jetty	550	5
Chinese bund	900	1–4
West of the Inner harbour, Well's (Old) jetty ..	270	3
West of Middle point jetty	180	4½

Port Facilities

On 'Mole Wharf' there are two customs godowns equipped with net slings, with 24,000 square ft. of storage space. Cornabe, Eckford and Co. have a godown near Customs jetty, on which there is a 3½-ton hand crane.

Except in the case of 'Mole Wharf,' all discharge and loading of cargoes is by means of lighters; manual labour is very cheap at

Chefoo and the handling of loads remarkably efficient. There is room for 60 lighters at Customs jetty, along the north side of which a constant depth of 5 ft. is maintained by dredging.

The Chefoo Harbour Improvements Commission has a modern salvage and ice-breaking tug, the *Chientai*, which is equipped with a salvage pump, a 10-ton windlass, and a 2½-ton capstan. Further salvage facilities include two sheerleg barges with lifting capacities of four and fifteen tons respectively, two iron lighters, one of which is convertable into a 10-ton floating crane, and three over-decked barges. There are a large number of lighters and three water boats available at the port.

Stocks of 8,000 tons of Kaiping coal are stored for bunkering, but coasters generally use the cheaper supplies available at Tangku. The Standard-Vacuum Oil Co. and the Texas Co. maintain small stocks of fuel oil (in drums), gasoline, and lubricating oil. Ample supplies of water and fresh provisions are also available. Minor repairs can be carried out by the Chefoo Harbour Improvements Commission and by two small private firms.

Until 1915, Chefoo was an open roadstead with no shelter from the east; lighterage was impossible for about 10 per cent. of the time, and considerable losses were suffered through delay and damage to cargo. During the period 1915 the artificial harbour was built by the Netherlands Harbour Works of Amsterdam at a cost of £350,000, raised by a bank loan and defrayed by a small tax on shipping and merchandise. The stone used in construction was quarried in the large quarries at Chefoo cape.

The port is operated by the Chefoo Harbour Improvements Commission, which was closely associated with the Chefoo office of the Chinese Maritime Customs; the C.M.C. Preventive Service for North China was operated from Chefoo and had much success in reducing the prevalence of smuggling in the area until Japan obtained control over Manchuria in 1932.

In 1936 the Commission purchased a new large Priestman dredger with a view to further deepening and dredging of the Inner harbour. Plans were drawn up to improve the harbour further by widening the mole on the inner side by 200 ft. for 1,800 ft. from the base, and by 31 ft. as far as the 'Mole Wharf,' by adding an additional 300 ft. of width to the outer side along a frontage of 1,200 ft., by the construction of lateral piers, seven to ten in number, along the inside, and by the laying of railway tracks and the building of godowns on the greatly enlarged mole.

The Town

Chefoo (Yentai) stands on the sandy southern shore of Village bay, but has also expanded eastwards beyond Tower hill. There is no foreign settlement or concession, but a recognized foreign quarter on Tower hill and along the beach to the east is well kept with clean roads and electric light. The town is also supplied with electric light from an inefficient and overloaded plant, and has a poor water supply from wells ; there is no modern sanitation system. The American Presbyterian Mission maintains a large hospital at Temple hill, while there are two other small hospitals. There are good hotels, safe bathing beaches and other amenities for holiday makers, and Chefoo, with its bracing climate, had become a popular summer resort for Europeans.

History

Chefoo was officially opened as a treaty port in 1863. The Treaty of Tientsin (1858), after the second Anglo-Chinese war, designated eleven additional treaty ports, and of these Tengchow was replaced by Chefoo in 1862.

In the early days of the port, a foreign ' Roads Committee ' directed the affairs of the foreign quarter ; this was succeeded in 1910 by an ' International Committee ' of six foreigners and six Chinese, which ceased to operate in 1930, when the foreign quarter came under the Chinese administration of the remainder of the town. In 1933, Chefoo was constituted a Special Area by the Chinese provincial authorities, and the city limits were extended to include a number of surrounding towns and villages. The head of the administration is the commissioner (equivalent to a mayor), appointed in the first instance by the governor of Shantung province ; foreign interests are now in the hands of the foreign Chamber of Commerce.

Trade

In 1936, the total shipping entered and cleared at Chefoo amounted to 4,241,292 gross registered tons, of which just over 80 per cent. was in domestic trade. The total value of the trade of the port in the same year was \$54·4 million, of which domestic trade accounted for \$37·9 million.

Exports from Chefoo were mainly agricultural products such as groundnuts, beancake, vermicelli, fruit and wines, and textiles, especially pongee, raw silk, hair-nets, embroidery and lace. The main imports included cotton and linen for the local hand-work

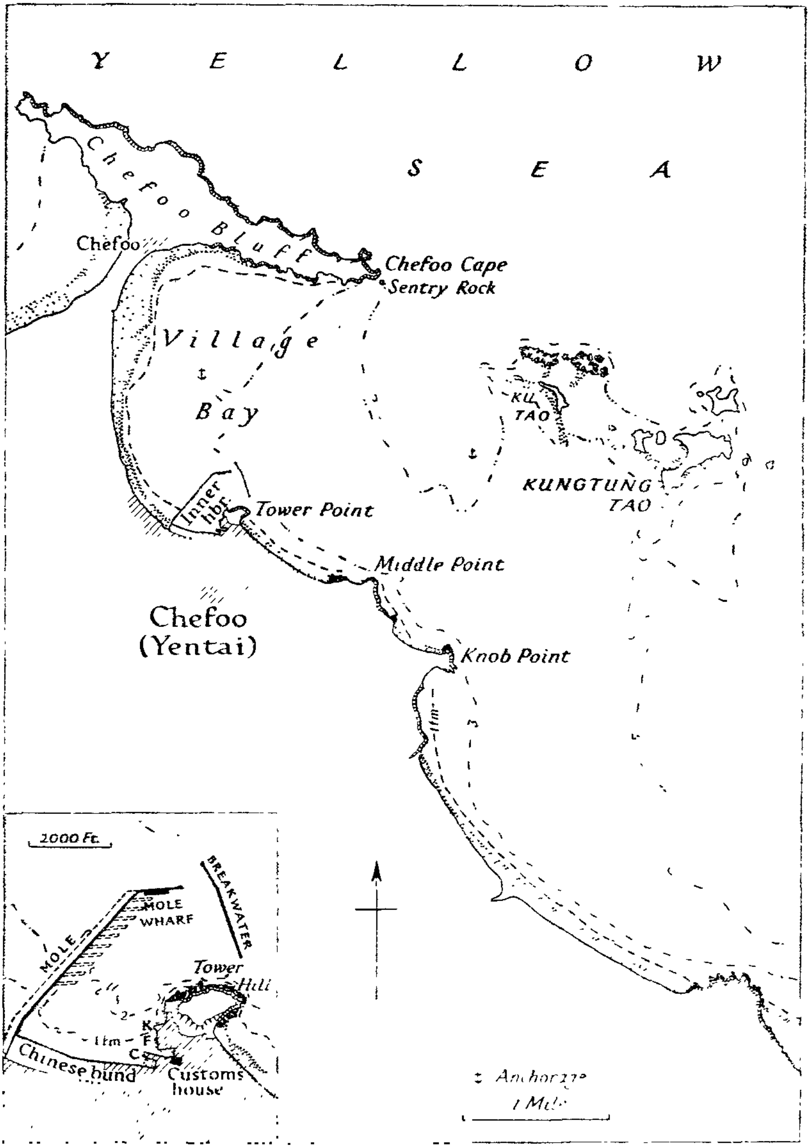


Fig. 77. Chefoo

In the inset the broken lines indicate the projected developments of the Inner harbour. C, Customs jetty ; F, Fergusson's jetty ; K, Kaiping jetty.

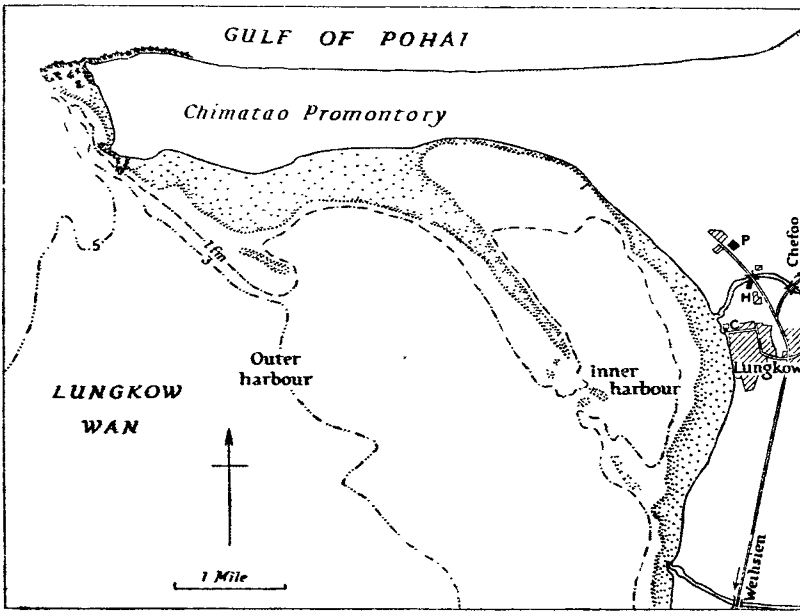


Fig. 78. Lungkow
C. Customs house ; H, Hospital ; P, Power station.

industries, mineral oils, cotton piece-goods, beans, sugar, and sundry manufactured articles.

Over 50 per cent. of the foreign imports into Chefoo originated in the Japanese Empire; Great Britain, U.S.A., and Germany also played an important part. In the export trade, Hong Kong led with about 30 per cent. of the total; the Japanese Empire, Australia and Great Britain following in that order. Japan did not figure as largely in the trade of Chefoo as in the trade of other North China ports.

There is a considerable passenger traffic from Chefoo, as many as 250,000 in a single year; the great majority of these are migrating farm labourers.

Since 1937, the import trade at Chefoo has expanded considerably, but the export trade remained at much the same level; Japan has increased her share of the total trade to about one-half.

Industries

The Chefoo district is essentially agricultural, but there has always been a considerable peasant hand-work industry. The manufacture of silk pongee, hair-nets, lace and embroideries is thus the most important industry of Chefoo. Other industrial concerns include a cannery, silk filatures, a brewery, flour mills, match and clock factories.

Communications

There is no railway from Chefoo at present, but a line to Weihsien, via Tengchow, Lungkow and Laichow, has been proposed in connexion with the further development of the port.

The most important road is the motor highway to Weihsien, 180 miles to the south-west, following the route of the projected railway; other roads run to Weihaiwei and Tsingtao. None of the roads are metalled, but the earth surfacing used is satisfactory except after heavy rains, which may render them unusable for one to three days. Daily motor-bus services are in operation to Weihsien, Weihaiwei, and Tsingtao.

Chefoo is an important station on the Shanghai–Chefoo–Tientsin (Taku) submarine cable line; this line, along with that to Weihaiwei, was controlled by the Chinese Government Telegraph Administration until 1938, when they were both taken over by the Japanese-controlled North China Telegraph and Telephone Company. The Chefoo–Dairen cable was operated jointly by the Chinese and Japanese

governments, but was taken over by the latter in 1937. There is also a commercial W/T station operated in 1935 by the Ministry of Communications; another was completed in 1937 for the Maritime Customs. Chefoo is also linked by telegraph land lines to all the important inland cities.

Lungkow

Lat. 37° 39′ N., long. 121° 20′ E.	Population, 15,663.
Admiralty chart 1255.	Fig. 78.

Lungkow harbour is situated at the mouth of a small river, south of Chimatao promontory, about 80 miles west of Chefoo. It serves as the port for the town of Hwanghsien, situated 14 miles inland to the east, on the Chefoo–Weihsien highway.

Approach and Access

A bar at the river mouth takes the form of two spits, one extending south-east from Chimatao promontory, the other running north-west from the mainland. In between is a narrow entrance with a least depth of 6 ft. leading into the Inner harbour. Depths at Lungkow may be considerably affected by winds, and it is inadvisable for vessels drawing more than 9 ft. to enter.

The Outer harbour is sheltered from the north, but during westerly winds a heavy swell sets into the harbour and makes lighterage difficult.

The Inner harbour is very well sheltered; its clay bottom can be easily dredged, but it is unlikely that extensive improvements would repay their cost owing to inadequate communications over a poorly developed hinterland.

Lungkow is the most northerly port in China open all the year, though it is occasionally frozen over with thin ice (in 1936 this persisted until mid-March), which handicaps the movements of small craft. The tidal rise at M.H.W.S. is about 5 ft., and at M.H.W.N. about 4 ft.; there is considerable diurnal inequality.

Detailed Description

The Outer harbour has a safe and commodious anchorage in depths of 14–20 ft.; the Inner harbour is also roomy, but depths available here vary from 6–12 ft., and may be less with north-easterly winds. There are no mooring buoys at Lungkow and all vessels moor to their own anchors, loading and discharging cargo by means of lighters. The normal landing-place is the Customs jetty, but

even at high water the depth alongside does not exceed 3 ft. A new wharf, 147 ft. long, was built north of the Customs house in 1936. A reinforced concrete pier, built 1½ miles north-west of the town, was never used, and has fallen into a state of disrepair.

Port Facilities

Ample water is available but stocks of provisions are small. A supply of fuel oil, sufficient for local fishing trawlers, and of kerosine is maintained; there are stocks of coal of up to 1,000 tons. As well as about 50 lighters, there are numerous native craft at the port. There is a hand-crane available for light loads.

The Town

Lungkow is a straggling Chinese town, and has a single long main street with many small shops and stores. In 1924, development northwards of the present site was planned but never came to pass, although an electric power station was built, which supplies the town with light. There is a single small private hospital. Lungkow was declared a treaty port in 1915 as a sequel to the 'Twenty-one Demands' made on China by Japan (see vol. ii, p. 80).

In 1936, shipping to the extent of 732,392 tons entered and cleared at Lungkow, of which about two-thirds was in domestic trade. The total value of trade in 1936 was $13·1 million, of which $8·5 million was in domestic trade. These statistics do not represent the full value of the trade of the districts, as an appreciable quantity of goods comes by roads and tracks. Furthermore, owing to the prevalence of smuggling in North China in 1936, imports from abroad were below normal.

Vermicelli, groundnut oil, live cattle, vegetables, fruit, and straw hats and joss sticks were the leading exports; imports included cotton piece-goods, coal, kerosine, timber, sugar, cereals, and fertilizers. Japan dominates the trade of Lungkow, though Hong Kong plays a leading part in the export trade; since 1927, Japan has further consolidated her position especially in the import trade, while exports fell off considerably.

Communications

Lungkow is on the Chefoo–Weihsien highway (see p. 403) and daily motor-bus services are in operation to both these cities; this road also runs through Hwanghsien. The Lungkow telegraph station is linked via Chefoo with all parts of China.

TIENTSIN

Lat. 39° 9′ N., long. 117° 11′ E. Population (1936), 1,292,025.
Admiralty charts 2653, 2654. Fig. 79. Plates 101-3.

Tientsin, the second port of China, is situated at the junction of the Grand Canal and the Hai ho, which flows into the Gulf of Pohai, 33 miles downstream. Taku, at the river mouth, and Tangku, 2 miles farther up river, are the outports of Tientsin and are used by vessels unable to proceed up the Hai ho.

Approach and Access

The coast of the Gulf of Pohai, near the mouth of the Hai ho, has mudbanks extending for 3 miles. A further 2 miles to the east is Taku bar, some 5 miles in width, through which a channel for shipping is maintained by constant dredging to offset rapid accumulations of silt after heavy floods. During 1937, the depth in this channel varied from 7·3 ft. at lowest high water in December to 19·75 ft. at highest high water in August, and in November 1938 the minimum depth at average high water in the centre of the channel was 15 ft. The accumulation of silt brought down by the Hai ho causes considerable variation of depths in the channel, which in 1937 was reported to be moving gradually southward.

The Hai ho between Taku and Tientsin is constantly changing its depth, though the Hai Ho Conservancy Commission endeavour to maintain such a depth in the river that vessels of up to 13 ft. draught can reach Tientsin at average high water. It is essential to obtain the latest information on the state of the river before proceeding upstream and to obtain a pilot for journeys to and from Tientsin.

Tidal rises are as follows:

	M.H.W.S.	M.H.W.N.
	ft.	ft.
Taku bar	$10\frac{1}{4}$	9
Taku	$9\frac{1}{2}$	$8\frac{1}{2}$
Tientsin	$10\frac{1}{2}$	$8\frac{1}{2}$

Sea levels are much affected by the direction of winds, easterly winds raising them and northerly winds lowering them. The rate of tidal streams in the Bar channel is from 1 to 2 knots, and at Taku from 3 to 4 knots. Severe winter gales with frost and snow may be

experienced in the Gulf of Pohai, but typhoons are rare. Ice may be expected off the mouth of the Hai ho from November to March, where the river may become completely ice-bound. Though an ice-breaker service is maintained at Taku, severe icing may render the river unusable, and such conditions prevailed for three weeks in early 1936.

Conservancy

The shallow and tortuous Hai ho presents unusually complex conservancy problems (see vol. i, pp. 60–1 and 69–70). It carries away the waters of a vast area of the North China Plain, drained by numerous streams which are heavily laden with silt during the floods of summer. At various times the river is dangerously low, in flood, or ice-bound. The Yungting ho, one of the chief tributaries, may be almost dry in winter, but in summer silt load is usually 25 per cent. by weight, and has approached 40 per cent. Every six or seven years the region is subject to severe and destructive flooding, and the Hai ho becomes heavily silted with considerable disruption to trade.

In 1897, the Hai Ho Conservancy Commission was established to deal with these difficult problems. The Boxer rebellion put an end to its activities temporarily, but it was reconstituted in 1901. The work accomplished by the Commission included the straightening of the river by five cuttings to make the work of the tide more effective (vol. i, Fig. 22), the regulation of canals drawing water from the Hai ho by locks, constant dredging of the bar and river channels, and the diversion of silt-laden waters into a settling basin. Future conservancy works on the Hai ho were projected in 1938, though the final solution of the problem would demand operations over the whole drainage area. The Commission, now under the control of the National Economic Council, has foreign representatives on its Executive Board, maintains a staff of engineers directed mainly by foreign experts, and draws its revenues from the funds of the Maritime Customs. It has met with marked success in the difficult task of improving the navigational facilities of the port. Whereas between 1890 and 1898 there were periods when even lighters were unable to ascend the river, in 1925, 1,702 sea-going vessels reached Tientsin; of these 1,100 were of 13 ft. draught or over, the maximum draught being 18¼ ft. During the five-year period 1933–37, an average of 1,007 vessels reached Tientsin annually, with a maximum draught in 1936 and 1937 of 14 ft. 5 in. There was a temporary cessation of conservancy activities in 1937, but the Commission and the Japanese military authorities were reported to be on good terms.

Detailed Description

Taku roadstead lies immediately seaward of Taku bar; the roadstead, though exposed, offers an anchorage with good holding ground in a depth of 24 ft. Vessels which anchor here are either waiting for a favouring tide or have so deep a draught that they are unable to cross the bar, and discharge and load cargo by means of lighters, weather conditions often preventing the working of cargo. Sheltered anchorage is also available at Deep hole in the river mouth and in the lower reaches of the river.

Taku and Tangku. Except when there is unusually heavy silting in the Hai ho, the outports accommodate vessels of no deeper draught than Tientsin itself does, since the criterion for all is the depth on Taku bar. Many vessels, however, do not undertake the difficult journey upstream, especially when icing is severe. Though vessels of up to 350 ft. in length can swing at Tientsin, vessels of over 300 ft. generally remain at the outports.

There are five mooring buoys at Tangku giving four rear-and-stern berths for vessels up to 350 ft. The following wharves are available for shipping:

Wharf	Length of frontage	Depth at L.W.O.S.T.	Area of godown space	Remarks
	ft.	ft.	sq. ft.	
Chinese naval dockyard wharf	647	1	..	Wooden piles
Taku Ironworks wharf	643·	8–12	..	Wooden piles
Butterfield and Swire's wharf	1,000	14	10,000	Three berths; two small pontoons each; rail connexion
Chi Shun Cement Co. wharf	170	16	20,000	Concrete
A.P.C. wharf	1,100	7	34,106	Pontoons, rail connexion
Jardine, Matheson and Co. wharf	81	6	8,008	Wooden piles
C.M.S.N. Co. lower wharf	377	3	17,600	Pontoon; rail connexion
K.M.A. wharf	1,315	3·6	7,383	Concrete
Customs wharf, Tangku	..	6	..	Pontoon
Railway wharves	2,470	10	..	Wooden piles
Japanese military wharf	720	10	..	Wooden piles
Salt wharf	600	12·8–14·4	5,329	Wooden piles
French wharf	225	14·4–17·4	11,285	Pontoon
Tung Shing wharf	740	16	..	Wooden piles
C.M.S.N. Co. upper wharf	252	16	..	Wooden piles
Teh Ta wharf	2,510	11·5–12·8	..	Wooden piles (collapsed)
Railway wharf, Hsinho	669	10	64,000	Wooden piles
Ta Hua Petroleum Co. wharf, Hsinho	84	15·7	30,585	Wooden piles
S.O.C.O.N.Y. wharf, Hsinho	333	3·6	25,000	Wooden piles (collapsed)

There are also jetties off Taku pilot town and off the Taku Tug and Lighter Co.'s yard. Since 1937, the Japanese are reported to have undertaken much construction of new wharves, especially on the north bank of the Hai ho, between Butterfield and Swire's wharf and the sea.

Tientsin. At Tientsin vessels are berthed along the stone and concrete bunds of the Concessions, which were reported in 1938 to have a depth of 16 ft. at high water.

Bund	Length	Bund	Length
	ft.		ft.
British bund	3,937	Former German bund (First special district)	2,296
French bund	4,921	Former Austria bund (Second special district)	no data
Japanese bund	3,280	Former Russian bund (Third special district)	8,942
Italian bund	no data	Former Belgian bund (Fourth special district)	3,280

There are 38 berths in all alongside these bunds capable of accommodating vessels up to 300 ft. in length and 15 ft. draught; practically all vessels are aground at half-tide on a bottom of soft mud. Since 1937, the Japanese have embarked on a programme of building extensive concrete bunds along both banks of the river for more than a mile below Tientsin.

Port Facilities

Unlimited supplies of coal are available at the port owing to its close proximity to the chief mining areas of North China. The Kailan Mining Administration has large yards at Tangku and Tientsin (Hoting) with stocks of up to 20,000 tons and 40,000 tons respectively. Bunkering is carried on by hand alongside the wharf at Taku and from boats and lighters at Tientsin.

Large stocks of fuel oil are kept by the leading oil companies. The Asiatic Petroleum Co. has installations at both Taku and Tientsin. At Taku the company's installation has five tanks with capacity for 14,500 tons of kerosine, and two tanks with capacity for 4,000 tons of gasoline; large stocks of gasoline in drums are also kept. At Tientsin, near the East railway station, there are three tanks with capacity for 12,000 tons of kerosine and four tanks for 2,000 tons of benzine; the company also has a can factory here. The Standard-Vacuum Oil Co. has installations at Hsinho and at Tientsin, near the former Belgian Concession; the total capacity of both

kerosine and gasoline was 56,820 tons at Tientsin and 14,430 tons at Hsinho, but the latter installation is now only used for supplying local needs. The Tientsin installation also has a can factory. The Texas Co. have five tanks at their Tientsin installation with capacity for 1,500,000 gallons of kerosine; stocks of lubricating oils and benzine are also kept. The Ta Hwa Petroleum Co. has at Hsinho three tanks for 345,000 gallons of kerosine and two tanks for 84,000 gallons of benzine.

Ships' stores and provisions can be obtained in large quantities; water for all purposes is available in ample quantities, supplied by the Taku Tug and Lighter Co. at Taku and at Tientsin from pipe lines on the bunds.

The following lifting appliances are available:

Taku and Tangku	
Taku Tug and Lighter Co.	One 16-ton and one 25-ton sheerlegs.
Chinese Naval Dockyard	One 50-ton sheerlegs, reported in bad repair.
Railway wharves	One 20-ton crane, one 15-ton hand crane.
Hai Ho Conservancy Commission Dockyard	One 30-ton sheerlegs.
Asiatic Petroleum Co.	One 35-ton floating position sheerlegs; hand capstan.
Tientsin	
British Concession bund	One 30-ton sheerlegs.

Details of dry docks at Tangku and Taku are as follows:

	Length	Width of entrance	Depth on sill at H.W.O.S.T.
	ft.	ft.	ft.
Chinese Naval Dockyard	360	40	12
Taku Tug and Lighter Co.			
No. 3 Dock	410	28	10½
No. 4 Dock	440	40	10½
Tientsin Lighter Co. .. .. .. (Butterfield and Swire)	600	53	10
Société des Establissements de Tongku	299	..	9
Hai Ho Conservancy Commission	450	52	..

Source: *Lloyd's Register of Shipping*, vol. iii, p. 74 (London, 1939).

The Hai Ho Conservancy Commission's dock is closed by a caisson, the remainder by mud dams. The Taku Tug and Lighter Co. has a repair slip 187 ft. long, two wet basins, 240 ft. by 128 ft. and 160 ft. by 112 ft. respectively, and a new dock capable of accommodating 16

lighters. These docks have built mainly tugs and lighters, and have workshops capable of executing repairs of all kinds. The Chinese Naval Dockyard, which was used mainly as an arsenal, was severely damaged in 1937 during the course of hostilities, and was reported as being used for minor repairs only to harbour craft by the Japanese.

The port is well supplied with harbour craft. As well as a large number of lighters and small native craft, in 1937 there were 2 passenger tenders and about 40 harbour and ocean-going tugs owned by the Taku Tug and Lighter Co., Butterfield and Swire, Dairen Kisen Kaisha, *Société française de Navigation de Tongku*, and other private companies.

The Town

The old Chinese city in Tientsin was enclosed by a rectangular wall which was partially destroyed by bombardment in 1900, and later pulled down completely and replaced by an esplanade. Suburbs have grown up on all sides of the old city, especially to the west and to the north, where the Chinese business quarter lies. They have also spread north-eastwards across the Grand Canal (Yun ho), and the Pei ho in the direction of the Central station. Much of this suburban area has been built on modern lines with new administrative and commercial buildings. The Concessions, which lie along the river banks to the south-east, were originally low-lying and swampy, but have been gradually reclaimed by filling. The Concessions area, which is laid out with broad streets and well-constructed bunds along the waterfront, is the chief commercial and trading quarter of the city. Industrial establishments are scattered throughout the city, but the most recent ones tend to be located on the margins, or near the railway and river. There are numerous bridges across the many waterways in the city area, of which the most famous is the International bridge between the French and former Russian Concessions, a bascule bridge operated and maintained by the Hai Ho Conservancy Commission.

There are several public parks and a racecourse to the south of the city. As well as primary, secondary, and technical schools Tientsin has six universities and colleges, of which Nankai University, situated to the south-west of the city, is the best known.

The Chinese municipality has its own electric power station, while the British, Japanese, French, and former Belgian Concessions have stations for supplying electric light and power to their own respective areas ; various industrial establishments have power plants for their

own use. There are two waterworks, one operated by the Chinese municipality, the other by the British municipality; these rely mainly on artesian wells as a source of supply, and between them cover the whole city. In the poorer Chinese areas river water is still largely used. The Concessions areas have modern sanitation systems, but the Chinese city lacks up-to-date facilities. There are 16 hospitals throughout the city and a quarantine hospital at Taku. The most important means of public transport in Tientsin is the tramway system, operated by the Belgian firm *Compagnie de Tramways et d'Eclairage de Tientsin.* Police forces and fire-brigades are maintained by the Chinese municipality and the concession authorities.

Tangku and Taku are villages of no great size and of little importance, apart from their functions as ports. The Pacific Alkali Co. works is situated at Tangku, and there are half a dozen or so power plants operated by various commercial concerns, which derive supplies of water both from artesian wells and from the river.

History

The origins of Tientsin date back to 1368 when a garrison station was established there. The city walls were built in 1425, under the Ming emperor, Yung Lo, and Tientsin, located at the northern terminus of the Grand Canal, rapidly developed as a trading centre. A Dutch embassy, on its way to Peking in 1655, declared it one of the busiest ports of all China. During the latter half of the nineteenth century Tientsin figured prominently in the history of the relations between China and the foreign powers. The Treaty of Tientsin, which ended the second Anglo-Chinese war, was signed in a temple outside the city walls in 1858. When hostilities were renewed in 1860 the city was bombarded by British and French forces, and in the same year the Convention of Peking declared it an open port. Anti-foreign riots occurred in 1870, and again in 1900 during the Boxer rebellion. The city was then occupied by an allied army after Tangku had been destroyed by fire and the Taku forts at the mouth of the Hai ho had resisted the landing of troops; these forts were demolished in 1902 in accordance with the terms of the Peace Protocol of 1901, which ended the Boxer rebellion.

When Tientsin came under the control of the National Government it was constituted a special municipality, administered by a mayor assisted by bureaux in charge of various municipal activities. The Japanese occupied the city in July 1937, shortly after the outbreak of the Sino-Japanese war.

The Concessions

As a result of the Convention of Peking, whereby Tientsin was opened to foreign trade, sites outside the city were leased in perpetuity by the Imperial Government to the governments of the United Kingdom, France, and U.S.A. Six other nations—Japan, Italy, Germany, Russia, Austria-Hungary, and Belgium—were granted concessions in the period after the Boxer rebellion (see vol. ii, p. 61), when the foreign powers put pressure on China to grant them additional powers and privileges. The following table shows details of the existing and extinct concessions at the outbreak of the Sino-Japanese war :

Foreign Concessions, Tientsin, 1936

Existing Concessions

Name	Date granted	Area	Population estimates (1937)
		acres	
British Original Concession	1860	76·0	
,, Municipal Extension	1897	253·7	
,, Extra-mural Extension ..	1903	588·3	
American Concession (incorporated)	1902	22·7	
British Municipal Area	Total ..	940·7	77,000
French Concession	1860–1900	430·3	71,000
Japanese Concession	1896–1900	324·4	36,000
Italian Concession	1901	117·0	7,000
Total area in foreign hands (1936)..		1,812·4	191,000

Extinct Concessions

Name	Date granted	Date relinquished	Area
			acres
German Concession	1895–1901	1917	369·3
Austro-Hungarian Concession ..	1902	1917	150·0
Russian Concession..	1900	1920	809·4
Belgian Concession	1902	1929	216·5
Total area returned to China by 1936 ..			1,545·2

Source : Jones, F. C., *Shanghai and Tientsin*, p. 131 (London, 1940).

British Concession. The original British Concession was administered by a council of three to five land-renters. In March 1897 a further area west of Taku road, known as the British Municipal Extension, was placed under British control and administered by a municipal council distinct from the council of the original concession. A further area, the Extra-mural Extension, was added in 1903, but not endowed with a municipality of its own. The anomalous situation thus created, of three areas under British control and differently administered, proved very unsatisfactory, and as a result of a petition addressed by the majority of the British residents to the British minister, the three areas were combined into the British Municipal Area, whose administration was entrusted to a single municipal council. This consisted at first of not more than nine members, of whom at least five were British residents, but in 1927 a new arrangement was made, and since that date the council has consisted of five British (including the chairman, who has a casting vote) and five Chinese members. The council is elected by the ratepayers, and voting privileges are largely in the hands of large land-renters and occupiers of premises. It is charged with the general administration of the municipal area under the powers granted to it by the Land Regulations, subject to some extent to the approval of the British Consul-General at Tientsin and of the British Ambassador. The ratepayers, thus acting as a body, imposes rates, taxes, and dues, raises loans, constructs or acquires public utility undertakings, and establishes or endows schools, hospitals, libraries, and similar institutions.

Under the control of the council are the Electricity Department, which has its power station on Weitze creek; the Waterworks, which draws its supplies from artesian wells; the Health Department, which maintains a general and an isolation hospital; two Municipal schools, one for foreign and one for Chinese children; the Fire-Brigade; the Municipal Police Force of about 700 men, and a small Concession Volunteer Force. From 1900 to 1940 the British government maintained a garrison of regular troops at the Concession.

The principal sources of revenue are sales of electricity, by far the largest contribution, water rates, taxation on real property, licence fees, and wharf and land dues. General administration, public works and utilities, police and fire-brigade are the principal heads under expenditure.

With the outbreak of the Pacific war, the Japanese occupied the

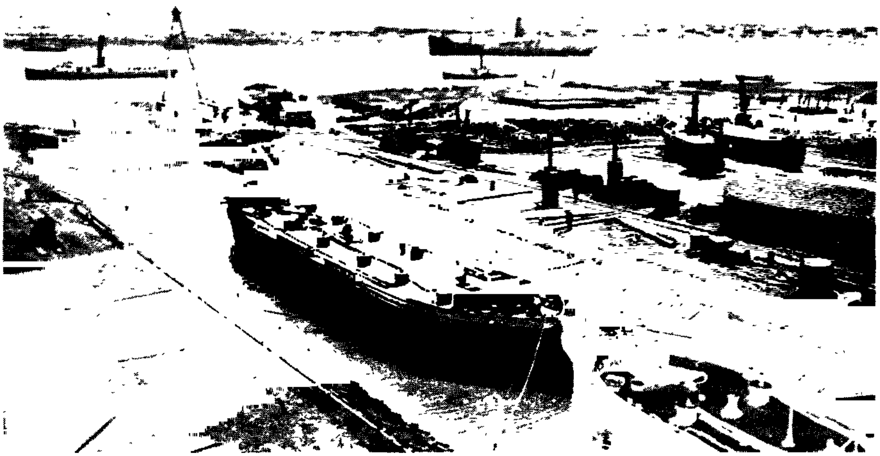


Plate 101. Dry dock, Taku
The Taku Tug and Lighter Company's dry dock on the Hai ho at Taku.

Plate 102. The Hai ho at Tientsin
Freighter berthed at the bund, Tientsin.

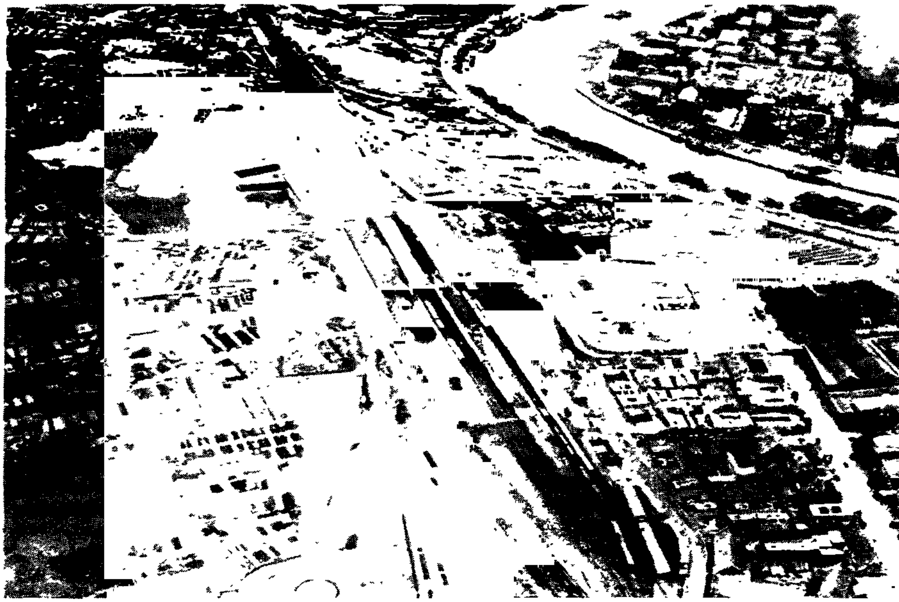


Plate 103. Tientsin
A view of East station, its goods yards, and the city in its neighbourhood.

Plate 104. Chinwangtao harbour
Ships are berthed at the pier (left) and the mole (right); in the background is the Bluff.

British Municipal Area. Furthermore, by the Treaty of 1943, the British government agreed to relinquish its administrative rights in the Municipal Area in favour of China.

French Concession. The original French Concession obtained in 1860 was extended in 1900 after the Boxer rebellion. The administration of the concession is largely in the hands of the French consul, assisted by a municipal council, which is composed of the consul himself (*ex-officio* chairman), four French members, four non-French foreign members, and three Chinese members. The principal sources of the concession revenues are land and rental assessments, licence fees, wharf and land dues. Expenditure is mainly on administration, public utilities, police and fire-brigade. There is also a small French concession at Tangku consisting of a military barracks. The French Concession was taken over by the Japanese in March 1945.

Italian Concession. Italy secured her concession at Tientsin in 1901, and also owns a very small fort, manned by a few men, at Tangku. Under the Fascist regime the concession administration was reorganized on the lines of an Italian fascist municipality. The chief power is in the hands of the Italian consul, who is assisted by a consultative council of Italians and Chinese. Revenue and expenditure are similar to those of the other concessions.

Japanese Concession. Although agreement was reached between China and Japan in 1896 on the question of a concession at Tientsin, it was not until 1898 that a satisfactory site was acquired; further grants of land were made in 1900. There is a municipal council of five Japanese members, but administration is mainly in the hands of the Japanese consul, who has absolute control of the police and fire-brigade, subject to instructions from the Japanese government at Tokyo. The municipality pays only its Chinese staff, the remainder being provided for by the Japanese Foreign Office. Land and rental assessments and licence fees are the main sources of revenue; expenditure is chiefly on administration and public utilities.

Former American Concession. U.S.A., along with Great Britain and France, was granted a concession at Tientsin in 1860, but the site was never effectively occupied and was handed back to China in 1896. In 1901, the American government attempted to establish an International Settlement at Tientsin similar to that at Shanghai. This effort to stop the unedifying scramble for concessions met with no co-operation from the other powers interested, so the United

States government attempted to recover their concession. Vested interests prevailed on the viceroy to refuse the American request, and in 1902 an arrangement was made to incorporate the area into the British Concession which it bordered. Certain rights in connexion with the concession were granted to U.S.A., but in practice were never claimed.

Other Extinct Concessions. The German and Austro-Hungarian Concessions were expropriated by China in 1917 on her entry into the war on the Allied side. The Russian Concession was brought under Chinese control in 1920, and all claims were formally abandoned by the U.S.S.R. in a treaty with China in 1924. The Belgian Concession was returned to China in 1929 under the terms of a special Sino-Belgian agreement. All these concessions were constituted special administrative districts administered by bureaux responsible to the municipality.

Industry

In addition to its position as the leading mercantile city of North China, Tientsin is an industrial centre of much importance. Easy access to markets and to raw materials and an abundance of labour have been the chief factors contributing to the development of industries, among which the manufacture of textiles predominates, owing to Tientsin's proximity to the chief cotton and wool producing region of China.

Seven cotton mills, with an aggregate of 250,690 spindles and 1,007 looms, were established in the period 1918–21, when the suspension of foreign imports as a consequence of the war of 1914–18 favoured such enterprises. These mills, which were Chinese owned and operated, were seriously affected by the resumption of foreign competition by the disturbed condition of China, and by the post-war depression. The loss of markets in Japanese-controlled Manchuria, Chahar, and Jehol, and the growth of smuggling of Japanese piece-goods into North China, forced several of the mills to close down and the remainder were overburdened with debt. By 1937 the Japanese had succeeded in acquiring four cotton mills with 174,283 spindles and 1,000 looms, while the three remaining Chinese-owned mills had only 70,866 spindles and 310 looms. A new Japanese mill was also in course of construction, others were planned, and existing mills proposed to expand their capacity. This programme of expansion envisaged altogether some 460,000 spindles and 9,000 looms, thus enabling Tientsin to rival Tsingtao as a centre of the

cotton textile industry. The difficulties of obtaining adequate raw cotton supplies and the abnormal war demand of Japan has hampered this ambitious programme. Of the five woollen mills in Tientsin the largest was an American-owned concern employing 800 hands; the four smaller mills were Chinese-owned, and employed altogether 900 hands. There are also weaving and dyers' establishments and hosiery knitting works, the latter of which were severely hit by the loss of the Manchurian market. There are four cigarette-making factories, the largest of which, owned by the British-American Tobacco Co., employed 4,000 operatives. Other industrial enterprises include flour mills, tanneries, chemical works, soap factories, cement works, match factories; most of these were small enterprises, which suffered severely during the 1931–35 depression and the loss of markets in Manchuria, and have, to a considerable extent, been bought up by the Japanese. New paper mills, leather factories, machine and engineering works, dye and chemical works and canneries were also in process of establishment by the Japanese. There also has been some development of heavy industry at Tientsin, and there are about 30 engineering works and machine shops, many of which are small concerns.

Investments in industry in Tientsin are almost equally shared by the Japanese and Chinese, but fully half the Chinese share represents capital from British, American, and other foreign sources. Since the outbreak of war there has been a steady increase in Japanese industrial interests, and the Japanese stake in the Tientsin area has now assumed considerable proportions.

Trade

Tientsin is the most important commercial and trading centre of North China, and ranks second only to Shanghai in China as a whole. Its lines of communication with its rich hinterland of the North China Plain and of the provinces of the north-west are particularly good, and serve to offset its disadvantages as a port. Since 1930, however, various factors, mainly political, have been responsible for a considerable reduction in its hinterland. The trade of Outer Mongolia and Sinkiang has been markedly redirected towards U.S.S.R., and the Trans-Siberian, Turksib, and Trans-Caspian railway systems, while the formation of 'Manchukuo' detached Manchuria and Jehol from Tientsin's economic orbit. Furthermore, the Lunghai Railway has been tapping the resources of Shensi and Honan to a great degree.

In 1936 the total value of the trade of Tientsin was \$364·8 million made up as follows :

	Imports	Exports	Total
Domestic trade	116·2	58·2	174·4
Foreign trade	72·6	117·8	190·4

In total value of trade and in foreign trade Tientsin has for long ranked second to Shanghai (see p. 324), but in domestic trade has generally been third to Shanghai and Hankow. A feature of the fifteen years before the outbreak of the Sino-Japanese war was the steady fall in imports, which declined in value from £22·9 million in 1922 to £4·3 million in 1936. Both 1935 and 1936 were distinguished by organized smuggling on a vast scale from the Japanese-controlled areas, expecially eastern Hopeh. The chief goods smuggled were those paying high duties, sugar, cotton piece-goods, artificial silk, yarn, and kerosine, and the trade returns not only of Tientsin but of other northern ports were considerably affected. Despite the contraction of its hinterland and the political and economic setbacks, Tientsin has continued to expand its export trade, due mainly to the increased productivity in the leading commodities of raw cotton, wool, furs, skins, and hides. From 1932 to 1936 exports increased in value from £5·0 million to £6·9 million. The increase in the export of raw cotton and wool is shown by the following table :

Value of Wool and Raw Cotton Exports (millions of dollars)

	1934	1935	1936
Wool	12·7	16·0	18·5
Raw cotton	12·0	13·5	23·3

Other leading exports of 1936 were skin and furs, pig bristles, woollen rugs and carpets, egg products, groundnuts, and other oil seeds, cereals, fruits, and salt.

In addition to the articles mentioned above, imports into Tientsin in 1936 included metals and ores, vehicles and vessels, machinery, other mineral oils, dyes and chemicals, books and paper, timber,

woollen goods, and miscellaneous manufactured goods mainly of metal.

Japan, U.S.A., Great Britain, and Germany were by far the most important foreign countries trading with Tientsin. The comparative percentages for these four countries in 1936 were as follows:

	Imports	Exports
Japan	12·0	24·1
U.S.A.	3·9	37·6
Germany	5·1	9·3
Great Britain	2·9	8·9

As will be seen, Japan preponderates in the import trade, and U.S.A. in the export trade. The most important of the remaining countries was the Netherlands East Indies, which imported petroleum products to a value of about £400,000 in 1936.

The total tonnage of entrances and clearances at Tientsin in 1936 was 5,165,247; of this 2,054,717 tons was in foreign trade, in which Tientsin ranked sixth to Shanghai, Canton, Swatow, Tsingtao, and Amoy. Tientsin's share of China's shipping traffic declined from 4·49 per cent. in 1932 to 3·56 per cent. in 1936, due largely to an increase on the part of its chief rival Tsingtao (see p. 392). Up to 1931 the Japanese shipping was in the lead, followed closely by British, with Chinese shipping ranking third. After the Japanese occupation of Manchuria a certain amount of Japanese shipping was diverted to Dairen, and in 1936 the position was as follows:

British	1,714,231
Japanese	1,442,589
Chinese	1,144,046

During the first seven months of 1937 Tientsin shared in the upward trend of Chinese trade, imports increasing by over 100 per cent., helped by a lessening in smuggling, and exports by over 50 per cent. as compared with the corresponding period in 1936. The outbreak of war, followed by hostilities not only at Tientsin but throughout North China, seriously disrupted trade. There was, however, a remarkable recovery in 1938, when the main scene of hostilities moved south to the Yangtze area, and smuggling no longer took place. Though, as compared with 1936, exports increased but slightly, from £6·9 million to £7·3 million in value, imports showed

a sharp rise from £4·3 million to £14·0 million. This increase was, however, not to the benefit of the Western Powers, as the following table of percentage shares indicates :

	Imports		Exports	
	1937	1938	1937	1938
Japanese Empire	37·0	60·0	22·2	55·8
U.S.A. and Dependencies ..	11·8	9·2	45·0	18·0
British Empire	16·1	15·4	15·0	11·7
Germany	18·4	5·7	12·9	10·6

Furthermore, Japan once more took the lead in shipping :

Japanese	2,292,607
British	1,763,461
Chinese	287,296

The new advantages thus gained by Japan were caused partly by the direct effects of the war, but also by the Japanese efforts to control all trade and commerce in North China.

Though conditions at Shanghai after 1938 returned to normal to some extent, from 1939 to 1941 the trade boom at Tientsin continued to increase to Japan's advantage. Figures for the value of foreign trade from 1937 to 1941 were :

Foreign Trade, Tientsin, 1937–41

	Value (millions of dollars)	Percentage share
1937	212·9	11·86
1938	409·9	24·74
1939	440·2	18·55
1940	811·0	20·17
1941 (Jan.–Sept.)	710·5	17·97

Communications

Above Tientsin the upper waters of the Hai ho, here known as the Pei ho, are navigable for shallow draught boats northward as far as Tungchow. The Hsi ho, which joins the Pei ho just above Tientsin, leads to a maze of waterways to the west with depths of

14 ft. in summer and of 4 ft. in winter ; junks travel as far as Tsingyuan (Paoting). The Grand Canal, here known as the Yun ho or Yu ho, with depths of 14 ft. in summer and of 6 ft. in winter, is navigable for large junks for 155 miles to the south to Lintsing, beyond which it is liable to run dry in winter and silts up after the floods of summer. Regular cargo and passenger launch services operate over these waterways and along the Hai ho to Taku, except during the ice season.

The two most important roads from Tientsin run north to Peiping via Tungchow and south to Tsinan via Tsangchow. Roads of poor quality also run along the Hai ho to Taku and Tangku, west to Tsingyuan and to Kaopeitien on the Peiping–Hankow railway, and north-east to join the Peiping–Mukden road. These roads are almost all of the earth type, and deteriorate after rain or under heavy traffic. Motor-bus services operate to Peiping, Tsingyuan, Tsangchow, and other points in Hopeh. There is an extensive road network in the city and suburbs ; those in the Concessions are metalled and of good quality.

Tientsin is served by two important standard-gauge railway systems, the Tientsin–Pukow railway and the Peiping–Mukden railway. The Tientsin–Pukow railway, which starts at Tientsin Central station, runs along the northern fringes of the city to Tientsin West station, and then south to Pukow, connecting with the Tsinan–Tsingtao railway at Tsinan. The Peiping–Mukden railway has two stations at Tientsin, Central station to the north-east of the city, and East station near the concessions on the left bank of the Hai ho. From East station the line runs to Tangku, and thence via Chinwangtao to Mukden, where connexion is made with the South Manchuria Railway. The Tientsin–Pukow railway is single-tracked, but the Peiping–Mukden railway is now reported double-tracked from Peiping to Chinwangtao. A Diesel railcar service operates to Tangku and Peiping along the Peiping–Mukden railway. The civil airfield is at Tungchutze, east of the city, and was used up to 1937 by the C.N.A.C. on their Shanghai-Peiping service.

From Tientsin telegraph lines run to Peiping, Taku, Chefoo, Mukden, Shanghai, and thence to all parts of China. There is a city automatic telephone service and long-distance telephone communication with Peiping, Tangku, Tsingyuan, Tangshan, Chinwangtao, and Mukden. Two submarine cables, owned by the Ministry of Communications, run from a cable station at the mouth

of the Hai ho to Shanghai via Chefoo. In 1935 the Ministry of Communications operated a W/T station at Tientsin with six call signs; the Japanese operate their own military W/T station, and there were private stations at Tientsin, owned by Jardine, Matheson and Co., and at Taku, owned by the Taku Tug and Lighter Co. In 1935 four medium-wave broadcasting stations were operating in Tientsin.

CHINWANGTAO

Lat. 39° 54′ N., long. 119° 37′ E. Population (1930), *c.* 27,000.
Admiralty charts 2357, 3378. Fig. 80. Plate 140.

Chinwangtao is situated in Shallow bay on the west side of the Gulf of Liaotung, about 10 miles west-south-west of Shanhaikwan, where the Great Wall forms the boundary between Hopeh and Liaoning (Manchuria). The port serves primarily for the shipment of coal from the Kaiping mines, some 80 miles to the west, and is also an important fishing centre.

Approach and Access

The harbour of Chinwangtao includes an Inner harbour and a dredged area immediately outside.

The entrance to the Inner harbour is 930 ft. wide, and the approach channel to it is maintained by constant dredging to give a least depth of 26 ft. There is no bar to the harbour, which has a bottom of soft mud on which vessels may ground with safety.

At Chinwangtao tides are both irregular and weak, occurring once every 24 hours; the rise of M.H.W.S. is $5\frac{1}{2}$ ft. Tides are greatly influenced by winds, tending to be high with east and north-east winds, and low with west and north-west winds.

The port is generally ice-free, and thus to some extent serves as a winter port to the hinterland of Tientsin, when the Hai ho entrance is rendered difficult of approach by ice. There is usually ice off Chinwangtao between mid-January and mid-February, but it is normally loose and broken. Ice is occasionally brought down from the head of the Gulf of Liaotung by north-easterly winds, and may extend a considerable distance seaward and make approach difficult for any but high-power vessels; in 1936 ice conditions were particularly severe, and brought shipping activities to a standstill for some time.

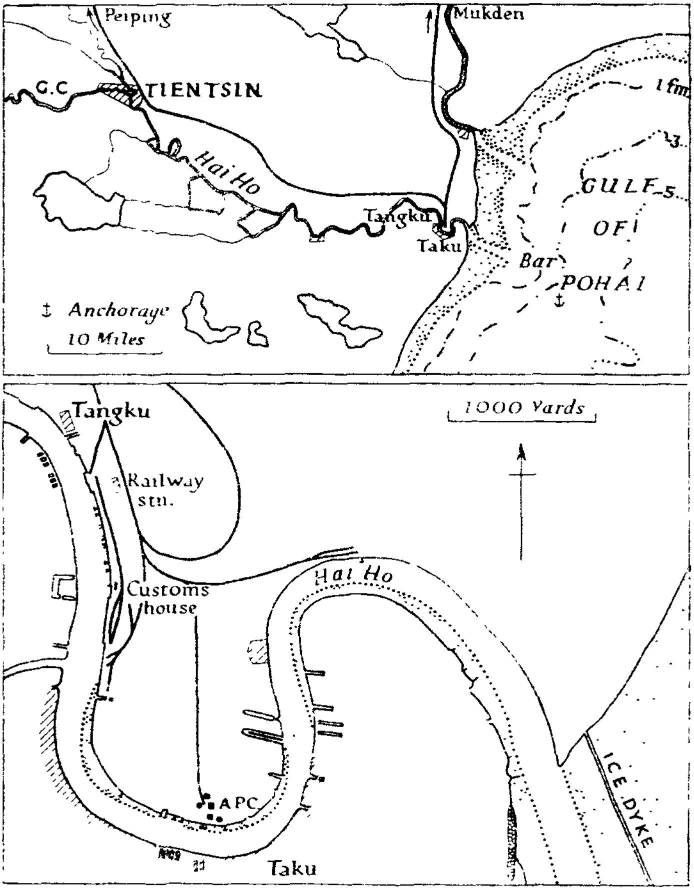


Fig. 79. Taku, Tangku, and approaches to the Hai ho
G.C., Grand Canal; A.P.C., Asiatic Petroleum Co.

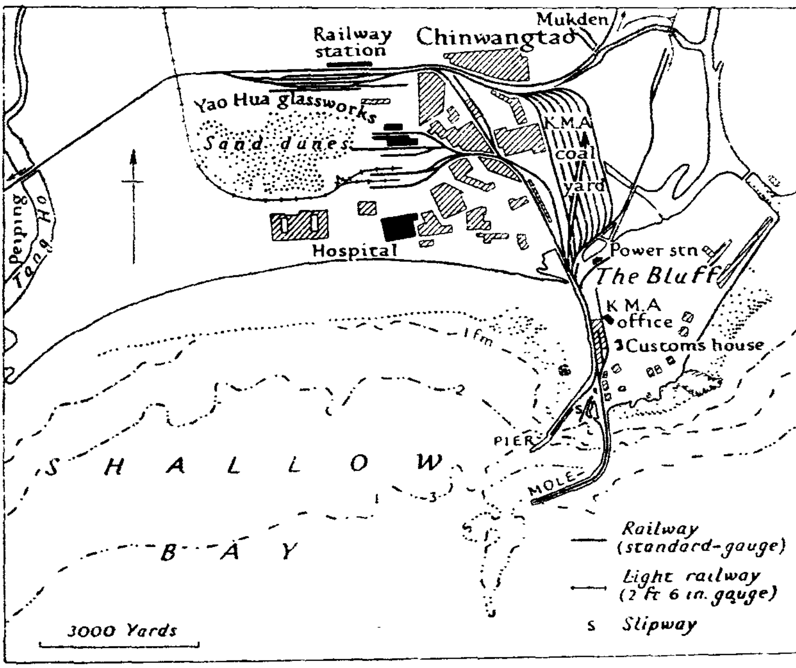


Fig. 80. Chinwangtao

Detailed Description

Vessels of any size can anchor safely at all times of the year in 6 fm. about 2 miles south-east of the mole; for large ships there is also an anchorage in 3–5 fm. about $\frac{3}{4}$ mile south of the mole, while small vessels can anchor west of the pier with fair shelter. The holding ground is good and mooring is generally unnecessary.

The Inner harbour has been constructed on the western side of a low rock promontory known as the Bluff, the eastern limit of Shallow bay. It consists of a single basin, enclosed by an outer mole 2,300 ft. long and by an inner concrete pier 360 ft. long.

There are seven berths available for shipping at Chinwangtao: one on each side of the pier and five along the inside of the mole. Details are as follows:

	Berth	Length	Depth alongside at L.W.O.S.T.
		ft.	ft.
Pier ..	No. 1	400	19
	„ 2	400	20
Mole ..	„ 3	300	21
	„ 4	350	25
	„ 5	400	29
	„ 6	400	29
	„ 7	420	29

Berths Nos. 5, 6, and 7 are in a continuous straight line, and can accommodate any length of vessel able to enter the harbour and berth.

There is also a small jetty extending south-south-west from the western side of the landing slipway at the head of the harbour.

Port Facilities

The Kailan Mining Administration (K.M.A.), which owns and operates the port, has three steam travelling cranes, one for weights up to 10 tons, and two for weights up to 5 tons each; there are thus no facilities for heavy loads, which must be handled by ships' derricks. Discharge and loading of cargo takes place directly to and from railway trucks on lines running the full length of both the mole and the pier. Work can proceed by night as well as by day for the port area is efficiently lit by electricity.

At the junction of the railway lines from the mole and the pier there are godowns, 3,995 square yards in extent, holding about

14,000 tons of cargo. The K.M.A. has a large coal yard on the reclaimed land north of the Bluff with stocks of up to 250,000 tons. There are two smaller coal yards to accommodate coal from the local Liukiang and Shihling mines. Bunkering is carried out alongside mole or pier by hand from railway trucks; the normal rate is 83 tons per hour, but as much as 12,000 tons of coal as cargo have been loaded in a full day. The coal is weighed on standard weighbridges, the unit being the metric ton of 2,204 lb. The Standard-Vacuum Oil Co. (S.O.C.O.N.Y.) keeps about 40,000 cases of kerosine and small stocks of lubricating oil in godowns leased from the K.M.A., but there are no facilities for loading or storing fuel oil. The Asiatic Petroleum Co. (A.P.C.) and the Texas Co. maintain small stocks of kerosine.

Unlimited water for boilers and drinking is available from the K.M.A. waterworks, which are supplied with water both from wells about 2 miles east of the port, and by pipe line from the Tung ho at a point 3 miles north-east of the town. There are main and auxiliary reservoirs on the Bluff, and hydrants at each berth on the mole and pier.

The K.M.A. also owns a large timber yard and maintains a large stock of general stores; small stocks of provisions, both fresh and preserved, can be bought in the town.

There is a landing slipway on the north side of the Inner harbour for handling tugs. The extreme length is 469 ft., the overall length of cradle 126 ft., and the lifting capacity 300 tons.

Minor salvage work can be undertaken by the K.M.A., which can carry out small running repairs in its railway workshops.

There are two tugs at the port. Of these the *Fu Ping*, owned by the K.M.A., although a sea-going vessel, is used mainly for harbour work, being equipped for ice-breaking and fire-fighting, and fitted with W/T. There are numerous lighters and launches.

The Town

Chinwangtao is an unwalled town, situated immediately north of the main Peiping–Mukden railway, and was estimated in 1930 to have about 20,000 inhabitants. The port area has a population of about 7,000 K.M.A. employees.

Chinwangtao was opened as a treaty port by Imperial decree in 1898 in accordance with the policy of voluntarily opening desirable ports, so that they might remain under Chinese control.

As a seaside resort for the European communities of Peiping and

Tientsin, Chingwangtao had few rivals in North China. It is easily accessible, has a dry bracing climate, safe sandy bathing beaches and picturesque hills nearby. The coast all the way to Peitaiho, 10 miles to the south-west, is lined by bungalows; hotels and a golf-links further add to the amenities of the district for holiday-makers.

The port owes its existence to the Chinese Engineering and Mining Company, which still holds a lease of the Bluff area, as a subsidiary of the K.M.A. The latter, formed by an amalgamation between the Lanchow Mining Company and the Chinese Engineering and Mining Company, is a Sino-British concern, controlled by British interests. The K.M.A. has an indefinite lease of the land south of the Peiping–Mukden railway, between the Tung ho and the creek immediately east of the Bluff. As well as owning and operating the port, the company has its own waterworks, railway workshops, and electric power station, which is situated one mile north of the port. There is also the smaller electric power station of the Chinese Electric Light Company near the main line station; installed and formerly operated by the K.M.A., it later passed under Japanese control.

The K.M.A. operates a modern sanitation system in the port area, but in the Chinese town methods are still primitive. In addition, the K.M.A. maintains a well-equipped modern hospital, while there is also a Chinese isolation hospital, under the Port Medical Officer, and a small private hospital.

Industries

Although the Chinwangtao area is predominantly agricultural there has been some industrial development attracted by easy access to coal from the Kaiping mines and to the facilities provided by the port.

The Yao Hua Mechanical Glass Company operates the largest glass-making factory in China, and employs about 1,000 workers; in 1936 Japanese interests acquired a number of shares in this company, which was formerly a K.M.A. subsidiary. There is also a large cement works, and the Japanese were planning the construction of a tobacco factory.

The two local coalfields, at Shihling and Liukiang, are operated by Sino-Japanese concerns, but their outputs are small. The K.M.A.-owned Kaiping mines are the most important in China Proper (see p. 89), producing annually about 5,000,000 tons of coal, which is exported through Chinwangtao to Shanghai, the Yangtze valley, and

the coastal areas of Kwangtung and Fukien. Since 1937, 60 per cent. of the exports of coal, which is of good coking quality, went to Japan for use in the steel industry of Yawata in Kyushu.

Trade

In 1936, the total shipping tonnage entered and cleared at Chinwangtao was 2,549,798 tons, of which just over 60 per cent. was in domestic trade. The total value of the trade of the port in the same year was \$27·8 million, of which domestic trade accounted for \$17·2 million.

The most important item in foreign trade is coal, amounting to 2·4 million tons in 1936; other staple exports are groundnuts, window glass, bricks, tiles and fireclay, and raw cotton. The chief imports include machinery, timber, textiles, and cereals. About two-thirds of Chinwangtao's foreign trade in 1936 was with Japanese territories; Hong Kong and the Netherlands in the export trade, Germany and Belgium in the import trade ranking next in importance.

From 1937 to 1941 the trade of Chinwangtao increased considerably; in 1939 the value of foreign trade had increased phenomenally to \$107·8 million, domestic trade at \$28·1 million showing a small advance. This conspicuous increase was mainly with Japanese territories (\$89·5 million in value), though imports from Great Britain and Belgium also showed a striking increase. The total entrances and clearances were 3,927,441, surpassed only by Shanghai, Tientsin, and Tsingtao. The cessation of wholesale smuggling, so rife in 1936, and the disturbed conditions at ports farther south due to military operation were chiefly responsible for this remarkable rise in the importance of Chinwangtao, which was maintained in 1940 and 1941.

Communications

Chinwangtao has direct rail communication with Peiping, Tientsin, Mukden, and other Manchurian towns by means of the standard-gauge Peiping–Mukden railway, which is double-tracked from Tangshan, near the Kaiping mines, to Chinwangtao. Light railways (2 ft. 6 in. gauge) run to the local mines at Shihling and Liukiang.

The K.M.A. has built modern macadamized roads in the leased area, the most important of which runs from the port to the main line railway station. Outside the K.M.A. area the roads are earth-surfaced in a constant state of disrepair; many are deeply rutted, suitable only for slow-moving traffic, and generally impassable after

heavy rains. The Mandarin road, the main highway from Peiping to Mukden, passes through Haiyang, about 5 miles north-east of the port. There is a daily motor-bus service between Shanhaikwan and Taitouying which passes through Chinwangtao.

The port has a local and two long-distance telegraph services, one to Manchuria, the other to places between Shanhaikwan and Tangshan. The Japanese have installed a military W/T station. Waterways are of minor importance and there is no civil airfield nearer than Shanhaikwan.

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Chapter X

ROADS

Conditions up to 1937: The Traditional Means of Communication; The Early Motor Roads; Road Planning under the National Government, 1928–37; Position at the Outbreak of War, July 1937; Problems of Road Construction; Road Traffic; The National Network.

War-time Developments, 1937–44: The New Network; Vehicles and Technicians.

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CONDITIONS UP TO 1937

In scarcely any other respect has the development of China been more retarded than in its facilities for transport. Inaccessibility has handicapped the country for centuries, and the development of an adequate means of communication is essential for further economic progress. In 1936 there were only 68,000 miles of roads, and over 70 per cent. of these were of earth construction. Expressed in terms of population, China had one mile of road for every 2,480 inhabitants, compared with figures for Britain of 98, for the United States of 16, and for France of 41. Lack of roads and other forms of transport has kept agriculture within subsistence limits, and obstructed the specialization of different regions in different types of production. Famine has been rendered inevitable because deficiency in one locality cannot be quickly supplemented by the surplus of another. Industrial development has been impeded since the output of the mass production factories cannot be marketed. The breakdown of the existing transport system is probably the outstanding cause of the weakness of China's military position in the Sino-Japanese war. It has also increased the political and administrative problems of government, and is perhaps the main reason why inflation is already beyond the possibility of control.

The Traditional Means of Communication

In the past the continental size of the Chinese Empire was a strong incentive forcing a coherent system of communications on China, and human experience quickly discovered the most convenient and cheapest methods. These methods which are still used extensively to-day are closely adjusted to the geographical setting. In the

desert regions of the north-west camels are the most common form of transport, but they give way to horses, mules, and donkeys where rough fodder is available. Two-wheeled carts drawn by oxen make their appearance in the thickly populated plains. The greater part of the transport, however, especially in the south, is accomplished by human labour without the use of animals. In the crowded lowlands the human burden is eased by the use of the wheelbarrow,

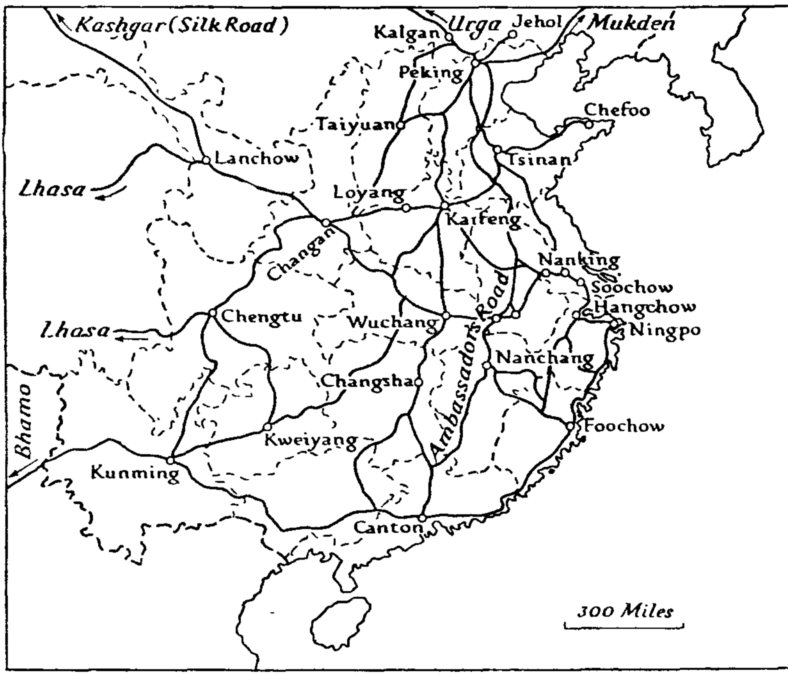

Fig. 81. Ancient highways

Based on Cressey, G. B., *China's Geographic Foundations*, p. 26 (New York, 1934). The Chinese Empire was linked together by a network of courier roads, centring on Peking and connecting the provincial capitals.

which proves a formidable competitor to pack animals in a land where fodder is scarce. There is also a large class of ricksha coolies and chairbearers, and carriers and porters using the bamboo pole with a load balanced on each end. The latter is a very common form of transport, and is most notable among the tea-carriers of mountainous western Szechwan and Sikang. The cost of all these means of transport is high, even at the low wages prevailing in China (Plates 105, 106).

From the foregoing it must not be thought that China has for long ages been without more substantial means of communication. Early emperors appreciated the value of roads, and tradition ascribes the first efforts at road building to the rulers of the third millennium B.C. The Chinese are said to have invented the courier system, and gradually an elaborate network of courier routes came into existence. By the time of Kublai Khan (A.D. 1278–94) there were some 2,000 miles of highways completely repaired and improved. Most renowned were the twelve Imperial Highways, which followed the lines of least resistance, and had the character of true roads. On the plains they were up to 20 or 25 yards in width, and often paved with large stone blocks, each weighing as much as a thousand pounds, and many weighing more than a ton. They all radiated from Peking, and some, like the Ambassador's Road, which led southwards to the Yangtze and the Canton delta, and the Silk Road, which led north-westwards through the Yumen to Central Asia, were very famous (Fig. 81). With the accession of the Ming dynasty, interest in road maintenance declined, and under the later Manchus the roads were allowed to fall into general and complete disrepair. Their upkeep was entrusted to local officials, who rarely bestirred themselves till the roads were impassable, when the necessary work was usually carried out at the expense of the inhabitants. The result is that many of these highways, with all their tradition of long service, have little more than their historical associations to recommend them.

The Early Motor Roads

In China the systematic construction of highways suitable for motor traffic started later than in other countries. The original exponent of better roads seems to have been Lo Kou-shui, who, as secretary and adviser to the Peking Ministry of Communications in 1913, urged the adoption of a road programme as a complement to the construction of a national system of railways then being planned. He believed that any large investment in railways would fail to yield adequate returns unless feeders in the form of modern roads were constructed to allow the produce of the tributary areas to be transported economically to the railways. His constant urging resulted in the promulgation during 1919 by a presidential mandate of certain regulations for the construction of roads under five categories—namely, international, national, provincial, district, and village. These, however, were not acted upon, and provided no

real stimulus to the creation of a co-ordinated national highway system. About the same time Dr Sun Yat-sen in his book, *The International Development of China*, envisaged a million miles of road in China.

The first efforts on a large scale were due to the American Red Cross Society, which in 1920–21 constructed 850 miles of roads suitable for motor traffic in Hopeh, Honan, Shansi, and Shantung as part of its famine relief programme. The Society's work awakened a desire for better results, and was followed by the formation in May 1921 of the National Good Roads Association, largely a Chinese merchants' movement headed by Dr C. T. Wang. This organization played an important part in propaganda for better roads. Besides publishing its *Good Roads Monthly*, which claimed a circulation of 8,000, it published 1,000 copies of a large work in Chinese entitled *A Book on Roads*. It also encouraged people to demolish ancient city walls and replace them with modern city highways, and wherever possible, it stimulated private interests to organize motor-bus companies.

On the practical side, however, the China International Famine Relief Commission (C.I.F.R.C.) did more than any other single agency in the actual construction and extension of roads in China before the establishment of the National Government. The motive was primarily humanitarian, but roads built to relieve famine could also be used for the ordinary purposes of commerce and industry. The Commission, by laying down roads, achieved two objects: it provided employment for able-bodied members of famine-stricken families on a bare subsistence wage, and it helped to provide against famine in the future. The roads constructed were chiefly of the earth type, since they were cheaper than macadamized roads and more easily maintained. In many areas the Commission was able to carry on its work irrespective of military operations and the instability of local governments. It did its initial work in Shantung and Kweichow, but its road-building activities were gradually extended to Yunnan, Kwangsi, Kiangsi, Honan, Hopeh, Shansi, and particularly to Kansu and Shensi. In the last two provinces it helped to start in 1931 the construction of the famous Silan Road from Sian to Lanchow. The work was eventually transferred to the north-western office of the National Economic Council for completion.

The activities of these organizations led to a considerable improvement in the general position. In 1921 China had only 730 miles

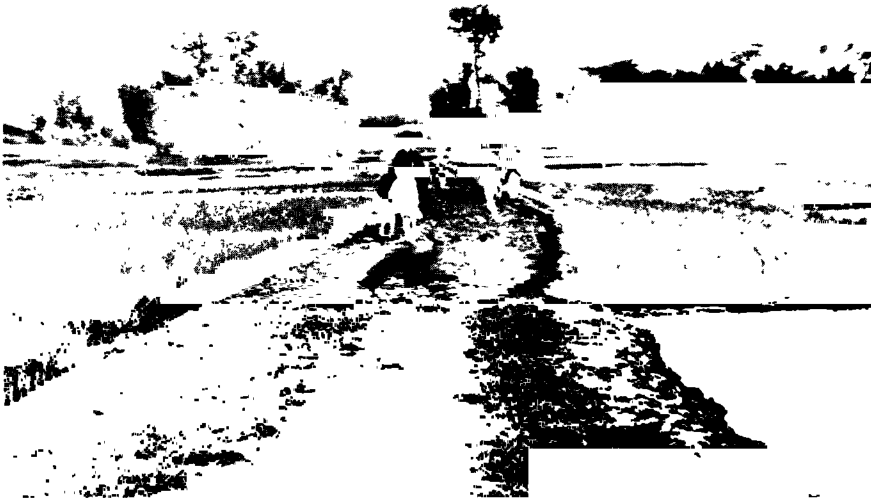

Plate 105. Road near Shuewong, Kwangsi

The majority of Chinese roads are unimproved tracks. In South China transport is carried on mainly by porterage and vehicles are few.

Plate 106. Road near Weiyuan, Kansu

In North China pack animals are widely used and two-wheeled carts, which cut deeply into the usual earth surface.

Plate 107. Motor road, Shansi
Part of a well-constructed motor road running the length of the province.

Plate 108. Motor road near Lanchow
In many parts of China roads are subject to disastrous washouts after heavy rains.

of road open to motor traffic, but by 1927 there were already 18,000, rising to 21,400 in 1929, the year in which the policy of the National Government came into effect. Even so, highway development lacked the stimulus and guidance of a co-ordinated programme during these early years, and was conducted in a sporadic manner by the different authorities. There were few great arterial routes except in the north, where the beginnings of a national road system began to take shape after 1925. In the south roads struck outwards in many directions within each province rather than concentrating upon the completion of a single highway to an adjoining territory. This was a grave hindrance to the development of commerce, and resulted in a lack of connexion between the several road systems, and a lack of uniformity in engineering standards.

Road Planning under the National Government, 1928–37

The inauguration of the National Government in 1928 marked the beginning of a number of serious efforts to carry out a far-reaching programme of highway construction. The most important step was the enunciation of certain general principles by the National Highway Planning Commission, a body created under an order from the Ministry of Railways in 1929. The co-ordination of provincial and local highway developments into a nation-wide plan, including an order of priorities, was agreed upon. The principles required that, in a country of such vast distances as China, highways should act as feeders to railways, and that projected lines, if not likely to be built in the near future, should be first constructed as national highways. It was argued that railway construction required the investment of large amounts of capital, which in most cases would not yield a return until some twenty to thirty years after the track had been laid. Road construction was less expensive, and in China was facilitated by the abundance of cheap though inexperienced labour. Roads could thus be constructed at a lower cost in a period when the financial resources of the government would not permit extensive railway development. A policy of road building intended to prepare the way for future railway construction undoubtedly had advantages in meeting economic, social, and political requirements.

The principles thus laid down were not in fact always adhered to by the National Government during its nine years of office prior to the outbreak of the Sino-Japanese war in 1937. For military and

strategic reasons many of the roads were built as trunk systems and not as feeders to railways. Quite often they were constructed with the forced labour of peasants who were not allowed to use their carts upon them. Development was mainly concentrated in the lower Yangtze valley and the south-eastern provinces, where it was partly designed to meet the strategic requirements of the central government in its campaign against the Communists in Kiangsi. Another reason for this concentration, particularly in the Yangtze delta region, was to be found in the economic and political predominance of Shanghai at this time. On the other hand, the south-west and north-west were not neglected. Chungking had been selected, and to some extent prepared beforehand, as a potential national capital in the event, foreseen by Generalissimo Chiang K'ai-shek, of the Japanese occupation of the lower Yangtze valley. Quite a lot of attention had been paid to the route to the north-west, and in the south-west the highway between Chungking and Kunming was completed before the outbreak of war. Although the National Government came into power in 1928, it was not until May 1932 that headway was made in the task of co-ordinating the road programmes of the various provinces. In that month the National Economic Council established its road office, which was later reorganized into the Bureau of Roads, a body which served as a co-ordinating and advisory agency in road-building, though it did not normally undertake actual construction. In addition to prescribing engineering standards and laying down traffic regulations, the bureau also advanced loans to provincial departments for the building of highways which it had approved. The selection between the various systems of highways lay in the hands of the National Government, and was dictated by considerations of general policy. The National Economic Council could itself construct entire highways in the event of such being beyond the financial resources of the local authorities. During the five years preceding the outbreak of war in 1937 the rehabilitation and extension of motor roads had been carried out with great speed.

The Three Province Programme

In view of the immense area of China and the government's limited financial resources, the Council at first (1932) concentrated on 'The Three Province Programme,' which embraced the 'home' provinces of Kiangsu, Chekiang, and Anhwei (Fig. 82). The following six lines were mapped out :

Name of Highway	Length in miles
Nanking-Hangchow	203
Shanghai-Hangchow	134
Nanking-Wuhu	57
Soochow-Kashing	42
Changhing-Suancheng	77
Hangchow-Hweichow	136
Total	649

Source: *Chinese Year Book*, 1936–37, p. 366 (Shanghai, 1936).

These highways were designed to link the chief cities of these provinces, and tap a number of areas considered capable of commercial and industrial development. The total length was 649 miles, but various sections were already in existence at that time, and the task of the Council was to supervise the construction of the remainder, amounting to about 310 miles. With the exception of the Hangchow-Hweichow highway, which because of technical difficulties was not completed until November 1933, all these roads were opened to traffic during the autumn of 1932 or the early months of 1933.

The Seven Province Programme

The rapidity with which these roads were constructed and the obvious advantages accruing therefrom encouraged the government to draw up further plans. In November 1932 delegates from Kiangsu, Chekiang, Anhwei, Kiangsi, Hupeh, Hunan, and Honan attended a road conference at Hankow, where 'The Seven Province Programme,' calling for the construction of a network of national highways in all the provinces represented, was then adopted (Fig. 82). Many important decisions were also reached regarding standard requirements for the construction of highways and methods of financing the scheme. The last and most important decision was that 40 per cent. of the expenditure, excluding that for earthwork and right of way, was to be financed in the form of a loan from the National Economic Council.

The conference agreed on the construction of 11 trunk lines and 63 branch lines, totalling over 12,400 miles. They were intended to establish a close bond among the central and coastal provinces by linking up all important centres in this area down to the Kwangtung-Kwangsi border. The following table indicates the eleven trunk lines and the main terminals:

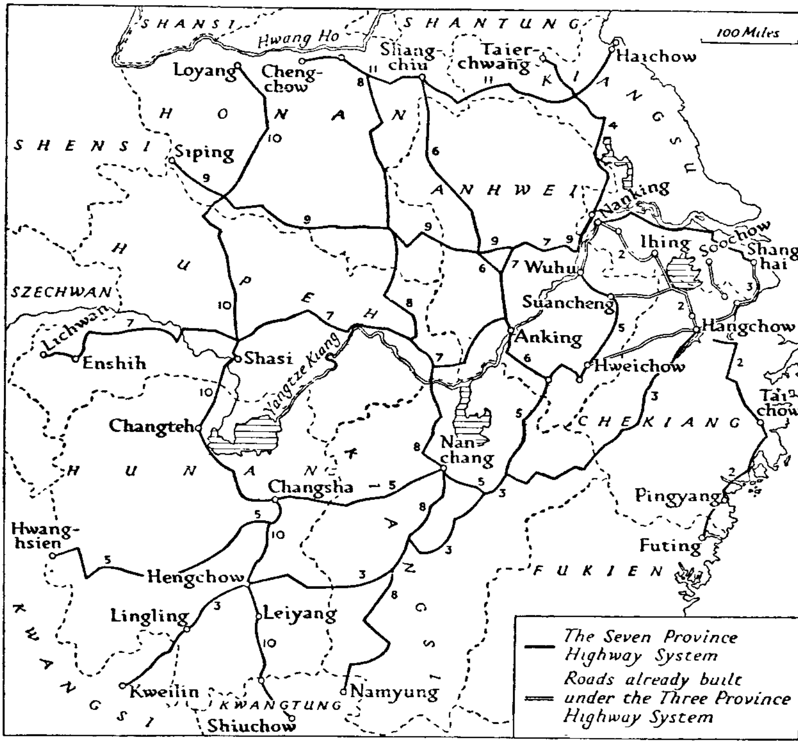

Fig. 82. The Seven Province Highway System

Based on a map issued in 1933 by the National Economic Council.
The numbers are those by which the various trunk roads were designated (see pp. 441–4).

Name of Highway	Starting point and Terminal	Length in miles
1. Nanking–Shanghai	Nanking to Shanghai . .	203
2. Nanking–Fukien	Nanking to Futing . . .	550
3. Shanghai–Kwangsi	Shanghai to Kweilin . . .	964
4. Nanking–Shantung	Nanking to Taierhchwang .	266
5. Nanking–Kweichow	Nanking to Hwanghsien . .	1,119
6. Shangchiu–Chimen	Shangchiu to Chimen . .	456
7. Nanking–Szechwan	Pukow to Lichwan . . .	874
8. Kaifêng–Kwangtung	Kaifêng to Namyung . .	999
9. Nanking–Shensi	Pukow to Siping . . .	472
10. Loyang–Shaokwan	Loyang to Shiuchow . .	1,042
11. Haichow–Chengchow	Hsukow to Chengchow . .	444
	Total . .	7,389

Source: *Chinese Year Book*, 1936–1937, p. 366 (Shanghai, 1936).

The suppression of the Communists in 1933–35 brought Shensi, Kansu, Tsinghai, and Fukien under the National Economic Council, and 'The Seven Province Programme' was expanded accordingly. Owing to the poverty of the provinces in the north-west the entire responsibility for the building of the main trunk roads was assumed by the Council.

Position at the Outbreak of War, July 1937

By 1937 the system planned in 1932 was largely completed with the exception of certain sections which presented special engineering difficulties. In addition several other roads had been built or were in process of construction in the north-western and south-western provinces. Of the total mileage constructed under the auspices of the National Economic Council up to the end of 1936, over one half were paved, the smaller proportion being earth roads, practically impassable in wet weather. The distribution and mileage of roads constructed and open to motor traffic under the augmented road programme of the Council in December 1936 was as follows:

Province	Surfaced roads	Earth roads	Total (miles)
Kiangsu . . .	844	1,028	1,872
Chekiang . . .	1,443	. .	1,443
Anhwei	731	1,430	2,161
Kiangsi	1,832	249	2,081
Hupeh	578	1,226	1,804
Hunan	1,293	119	1,412
Honan	167	1,619	1,786
Fukien	792	287	1,079
North-west . . .	249	934	1,183
Total . .	7,929	6,892	14,821

Source: Woodhead, H. G. W. (editor), *China Year Book*, 1939, p. 513 (Shanghai, 1939).

Local authorities in the provinces and municipalities have also undertaken much new road construction. The following table shows the combined efforts of both national and local authorities from 1921 to 1936, and also gives data of the combined mileage, distribution, and conditions of national and local highways in December 1936.

Length of Roads open to Motor Traffic in China (December 1936)

Province	Surfaced roads	Earth roads	Total (miles)
Hopeh	16	1,947	1,963
Honan	183	3,410	3,593
Shantung . . .	32	4,030	4,062
Shansi	..	1,678	1,678
Shensi	246	1,470	1,716
Suiyuan . . .	..	1,990	1,990
Chahar	..	1,602	1,602
Kiangsu . . .	1,125	2,178	3,303
Anhwei	735	2,602	3,337
Chekiang . . .	2,055	..	2,055
Kiangsi	2,822	1,030	3,852
Hupeh	620	2,135	2,755
Hunan	1,598	236	1,834
Kwangtung . .	596	6,420	7,016
Fukien	902	1,468	2,370
Yunnan	217	1,213	1,430
Kwangsi . . .	1,808	751	2,559
Kweichow . . .	1,104	..	1,104
Szechwan . . .	997	1,820	2,817
Sikang	..	472	472
Kansu	3	1,947	1,950
Tsinghai . . .	..	920	920
Ninghsia . . .	..	1,570	1,570
Sinkiang . . .	..	2,441	2,441
Liaoning . . .	..	1,980	1,980
Kirin	..	1,768	1,768
Heilungkiang . .	..	1,560	1,560
Jehol	..	1,445	1,445
Total . .	15,059	50,083	65,142

Source: Woodhead, H. G. W. (editor), *China Year Book*, 1939, p. 514 (Shanghai, 1939).

Problems of Road Construction

When considering statistics of construction it must constantly be borne in mind that many of the roads are extremely rough, and are not comparable to the modern straight and easily graded highways which are characteristic of Western countries. The usual method of construction throughout China, exclusive of the foreign concessions, is to cut or fill the proposed track to the required level, after which it may be rolled, but as often as not it is left for traffic to beat down. If rock is easily accessible it is sometimes used for foundation or surfacing purposes. In the latter case it is generally handbroken, placed on the road and filled in with sand or loose

earth. Until recent years very little mechanical equipment was used, though now there is a growing appreciation of the advantages of using machinery, as is shown by the purchase of steam and Diesel road-rollers, tractors, road-graders, and air-compressors for drills.

In the North China Plain the loess soil, which drains well and dries quickly after the rains, has favoured the construction of earth roads. They are built up from one or two feet above the general level of the plain, and in the dry season wear reasonably well under the medium loads carried in motors. The loess and clay contains a small percentage of lime, and if the roadway be given good drainage and a good crown the water soon runs off. A few hours' sunshine then serves to harden the surface, upon which rubber tyres soon produce a sheen comparable to that on asphalt. There also arises the difficulty of policing these roads so as to ensure that the destructive narrow-tyred Peiping cart should keep off those which are used by motor traffic. An earth motor road can be kept in condition only with the greatest difficulty when used by these carts, which are loaded by their owners to their full capacity. Again, drainage by side ditches and sufficient culverts and offtakes has been sadly neglected throughout regions where roads exist. Even in Shantung road drainage is necessary, yet the farmers dig ditches across the earth motor roads and let the water pass across to a neighbour, and then generally neglect to fill in the ditches. In Shansi province the roads are of a better quality, they are kept crowned, fairly well drained, and so policed that carts do not use them (Plate 107). On the other hand the cart roads have often been worn down far below the surface of the surrounding country. The use of macadam has not proved very successful. It is very expensive; the hauling of the rock, the breaking of it, and rolling costs are high as compared with those for earthen roads similarly situated. Macadam also suffers its worst deterioration during the long dry winters. The wind and suction of tyres remove the binder material between the cobbles; the latter soon become loose and the resulting holes can be repaired only at considerable expense. If not repaired the road becomes infinitely more rough than the dirt highway.

The construction of roads in the south is handicapped by unfavourable relief and by the heavy summer rains. Earth roads are not usable for more than eight months of the year, and even in the level regions near Nanchang and Changsha they get slippery too readily after showers. They require a coat of six or eight inches of gravel and macadam surfacing is necessary where gravel is not avail-

able. In the mountainous districts of western China, where the sticky nature of the clay in the valleys makes it unlikely that many earth roads will be constructed, limestone rock is convenient for macadamizing.

ROAD TRAFFIC

In addition to the actual condition of the roads, there are other elements affecting the utility of China's highway system. Shortage of motor vehicles has long been a serious handicap. The following table shows the number of motor vehicles registered at various periods up to the outbreak of war in July 1937:

Motor Vehicles Registered

On 1st Jan.	Passenger Cars	Trucks	Buses	Motor-cycles	Total
1922 . . .	no	data	avail	able	8,200
1925–29 (average) .	13,827	3,087	675	1,369 (average 1927–29)	18,958
1930–33 (average) .	24,832	7,667	5,630	2,399	40,528
1935 . . .	29,372	11,187	8,193	3,285	52,047
1936 . . .	27,465	11,917	8,060	2,135	49,577

Source: Greene, K. R. C., and Phillips, J. D., *Transportation and Foreign Trade in the Pacific*, p. 44 (New York, 1942).

In December 1936 there were in China less than 50,000 motor vehicles. Of these nearly a half were concentrated in Shanghai, while in some of the outlying provinces there were scarcely more than a handful of serviceable vehicles. There was also a shortage of fuel. China was at that time largely dependent on imports of gasoline and oil, and the effective maintenance of foreign communication lines was, therefore, essential to the continued success of motor transport.

On the other hand there had been a relatively rapid development of bus and truck traffic for the transport of passengers and goods. Several hundred commercial bus companies were operating on the government highways, not including the bus services maintained by provincial and municipal authorities. The buses in commission were not comfortable, judged by Western standards, but they were a great improvement on the springless Chinese carts.

The extension of the highway network also resulted in the development of motor touring for pleasure. Years ago motorists who ventured beyond the limits of the city in which they resided soon found themselves in difficulty. In 1936 pleasant trips could be made from such starting-points as Shanghai and Nanking. It was possible to travel within the three provinces of Kiangsu, Chekiang, and Anhwei within the space of one day, thus bringing Shanghai into touch with towns which formerly needed an arduous trip of three weeks. During 1936–37 the radius of motor touring was further extended, and trips were made between Shanghai and Canton, Shanghai and Tientsin, and Peiping and Jehol.

THE NATIONAL NETWORK

China, in spite of considerable progress, was very deficient in modern highways on the eve of the Sino-Japanese war. Through surfaced routes extended only from Nanking through the central provinces to the south and south-west and from Suiyuan and Shensi south to Kwangsi and Kweichow. Distances were long, and because of the newness of most of the roads facilities for ' stopovers ' and repair to vehicles were widely scattered. The whole of the country suffered from the lack of progress in road transport, and this was particularly true of north-western and south-western provinces.

In 1936 the main highways of China formed three distinct networks: (1) From a focus in the Shanghai-Nanking area trunk lines were thrown out to the extremities of the country; (2) A series of parallel lines followed a north-south course through Central China; (3) Finally a chain of roads, not quite completed, skirted the western borders from Suiyuan and Shensi to Kweichow and Kwangsi. A brief description of the main roads of each network is given in the following survey. (The numbers at the end of each road description refer to those on Fig. 82.)

The Nanking–Shanghai System (Fig. 82)

Nanking–Shanghai. This 202-mile surfaced highway via Chinkiang parallels the railway between the two cities. It crosses very flat country, and traffic is liable to interruption after heavy rain.

Nanking–Fukien. This highway runs through Hangchow by way of Ihing and Changhing, and then continues inland to Wenchow and down the coast to Futing (Fukien); from here to Foochow it is in very poor condition. The road is surfaced as far as Wenchow and

open to the Fukien border; from Foochow a partly surfaced road runs southward to Canton, via Amoy (2).

Chekiang–Kwangtung. This road leaves Shanghai and passes through Hangchow and north-western Fukien before joining the coastal roads near Canton. It is surfaced up to the Kwangtung border and alternately surfaced and earthed to Canton. Much of the Shanghai–Hangchow section, however, is unsatisfactory, and it is doubtful whether it is usable throughout its length at the present time (1944). Between Kinhwa and Pucheng the road crosses two river beds, which are liable to flood in the rainy season, and negotiates three steep passes where it is subject to 'washouts' by mountain torrents. South of Kienyang the road deteriorates and is narrower, though through-traffic should be possible at all seasons.

Shanghai–Nanning. In 1936 through-traffic was possible on the 1,440-mile road from Shanghai to Nanning via Nanchang and Kweilin. From Nanning there is a highway to Lungchow, the terminus of a road from French Indo-China. This trunk line is surfaced most of the way, and except for a short few detours it is a completed road. Travel is necessarily slow in the mountainous country of the south, and roads are slippery and liable to flood after rain (3).

Nanking–Yunnan. The 1,713-mile Nanking–Yunnan highway via Nanchang, Changsha, and Kweiyang was perhaps the most important of those converging on Nanking. Connecting at Kunming with the Yunnan Railway from French Indo-China, it became an important channel for the import of supplies from abroad after 1937. Although the highway was not completed before the war, it was open for through-traffic by way of a detour via Changteh. The direct route from Changsha to Kweiyang was open except for a short section in western Hunan. Most of the road is surfaced, but it traverses mountainous country which is difficult to cross in the winter months. In the spring of 1937 it took a government motor caravan nearly thirty days to cover the distance from Nanking to Kunming. In Kweichow the surface is often poor, the road is liable to landslides after rain, and there is a heavy dust in dry weather (5).

Nanking–Szechwan. By 1936 this highway, 1,037 miles long, was completed from Pukow to Chêngtu by way of Hankow, except for the section between Ichang and Chungking. Through-traffic was, however, possible via Shasi, Changteh, and Yuanling, though the

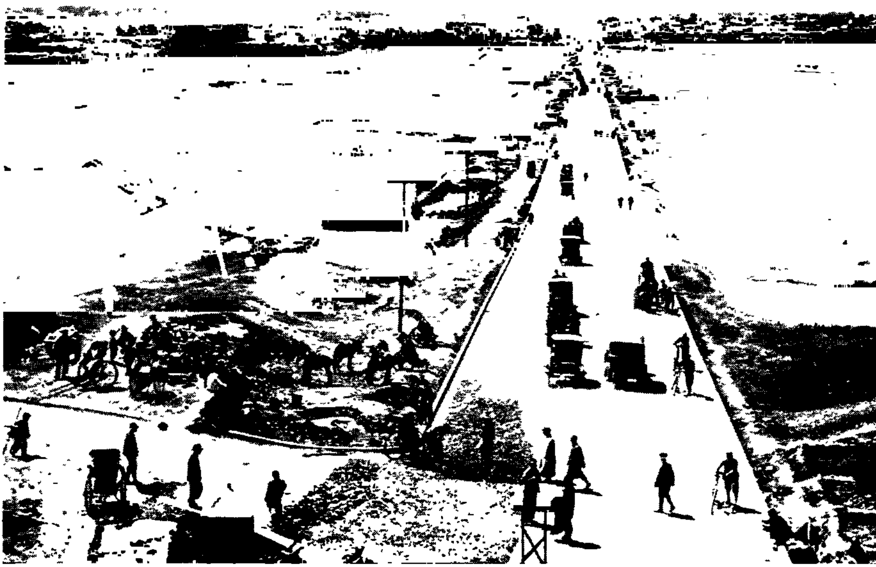

Plate 109. Changshan road, Nanking

When Nanking became the national capital, an extensive road-building programme in the city was planned. Changshan road runs from the port suburb of Hsiakwan to the city centre.

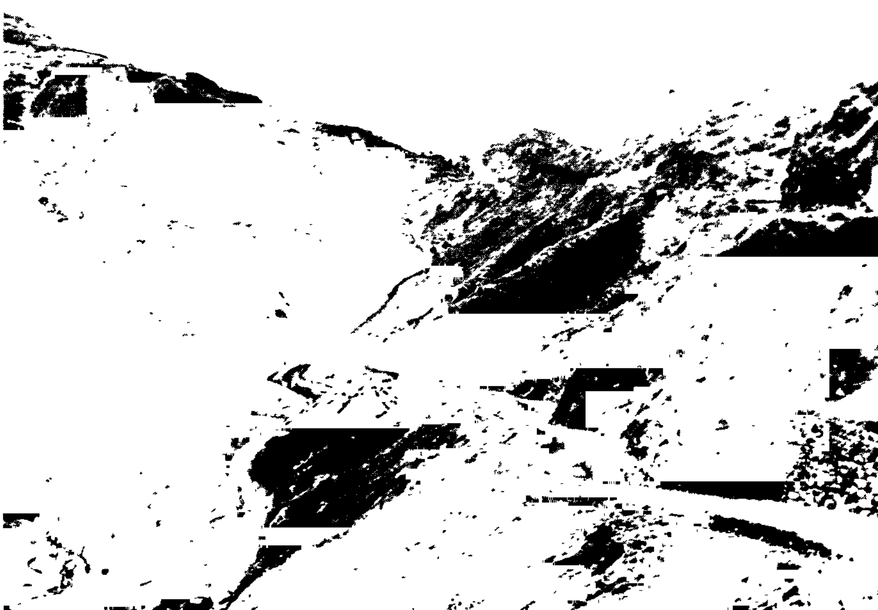

Plate 110. Mountain road, Chekiang

A well-graded motor road in a mountain pass south-west of Ningpo, between Kikow and Pamao.

Plate 111. Motor road near Pokwan, Chekiang
A bus station near Pokwan, a road junction on the Hangchow–Ningpo road.

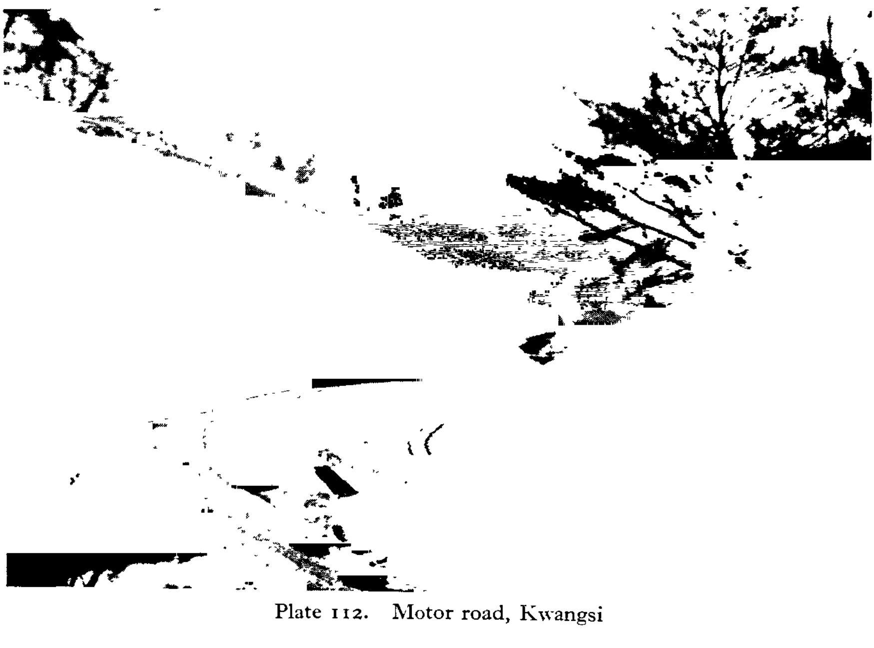

Plate 112. Motor road, Kwangsi

stretch to the west of Hankow was said to be impassable after heavy rain (7).

Nanking–Shensi. This is another important trunk line running 868 miles north-west to Sian and later extended to Lanchow. It is not surfaced except for short sections, but since it links Central China with the north-western highway network, it has become of considerable importance now that the eastern part of the Lunghai Railway has been captured by the Japanese. The Sian–Lanchow stretch was originally an old courier route, and the task of making it into a modern motor road was completed in 1935. A great deal of improvement was still needed and much of it was not surfaced (9).

Nanking–Shantung. Finally, there is the Nanking–Shantung highway, a 581-mile earth road from Pukow, opposite Nanking, to Loling on the Shantung–Hopeh border, which in 1936 was open except for the section near the Hwang ho (4).

The North-south System (Fig. 82)

In the second group of highways there were three important routes running south from the Lunghai Railway.

Shangchiu–Chimen. This leaves the railway in eastern Honan and follows the western boundary of Anhwei to Anking on the Yangtze kiang, crossing the Nanking–Shensi and Nanking–Szechwan roads on the way. About two-thirds of this highway is surfaced (6).

Kaifêng–Kwangtung. The second of these north-south roads leaves the railway at Kaifêng, passes through Hankow, and then turns east to Nanchang. From there it continues south along the Kan valley through Kanhsien to the Kwangtung border. In the north the road is mainly of earth, but south of Nanchang it is metalled and fairly solid, though it has been described as ' bumpy.' This road officially ends at the Kwangtung border (8).

From this main highway two subsidiary roads run to the coast: from Nanchang to Foochow and from Kanhsien to Amoy respectively. In 1936 through-traffic was possible at all seasons on the Nanchang-Foochow route, though east of Kienyang the road deteriorates, and later passes through mountainous country between Kienning and Foochow. Along the Amoy–Kanhsien highway there is a difficult stretch east of Juikin where the road crosses hilly country and is not properly graded.

Loyang–Kwangtung. The last of these routes leaves the railway at Loyang in western Honan. At Laohokow it connects with a road from Hanchung on the chain of highways skirting western

China. Continuing south, the main highway crosses the Nanking-Szechwan route north of Shasi, passes through Changteh and Changsha and follows the Canton-Hankow railway via Hengyang (Hengchow) to the Kwangtung border (Plates 113, 114). It is built of earth north of the Yangtze, and is surfaced to the south. At the Kwangtung border this road also officially ends, but communication of an unsatisfactory type can be made with Canton (10).

The Western System (Figs. 83, 85)

The western group of highways forms a trunk system extending from Suiyuan and Shensi to Kweichow, Kwangsi, and the south coast. These highways, which have received great attention since 1937 (see p. 445), are of immense economic and strategic importance, since they render Kansu and Shensi accessible to the rest of the country. In 1936 a road, partially surfaced, followed the Hwang ho from Paotow through Ninghsia to Lanchow, where it joined the road from Sinkiang to Sian. At Sian the highway swings west to Paoki, where a partly surfaced road took it south via Chêngtu, Chungking, and Kweiyang to Nanning.

East of Nanning the southern highways are of inferior type. A dirt road skirts the coast to Canton, after sending a branch to the tip of the Luichow peninsula. From Canton a dirt road, with occasional surfaced sections, continues to Amoy, where it connects with a surfaced highway to Foochow.

WAR-TIME DEVELOPMENTS, 1937–44

In the field of transport the outstanding war-time achievements lie in road rather than railway construction. The latter requires equipment which a blockaded and isolated China can neither produce nor import at the present time. The realization of the urgent need for the improvement of the highway network, and particularly for the extension of international lines, led to the establishment of the Bureau of Highways under the Ministry of Communications in January 1938. This organization is now responsible for highway construction and engineering and traffic control. In August 1939 the National Highway Transport Administration was created, also under the Ministry of Communications, and has control of all matters relating to civil transport on the highways, and undertakes the supervision of all highway administration in order to meet military and commercial requirements.

According to official reports over 47,200 miles of the highways in use before the war were in Chinese hands in the summer of 1942. In addition approximately 3,720 miles of new highways had been built, and some 3,350 miles were either under construction or being surveyed. Standards of construction have been laid down by the government which decree that the width of road base on trunk lines must be at least 12 metres (39·4 feet), on secondary roads 9 metres (29·5 feet), and on branch lines 7½ metres (24·6 feet). The maximum degree of elevation on slopes was fixed at 6 per cent., unless under special conditions, when it could be increased to 8 per cent.

The New Network

The needs of war-time and the movement of the centres of Chinese life to the west have created a need for a new alinement of routes, and have imposed new systems of networks, which have made considerable use of those already in existence. The roads of 'Free China' can thus be grouped conveniently into two main systems: (1) The south-west network with Kunming as its centre; (2) the north-west with Lanchow as its centre, while Chêngtu is the pivot of an intermediary group linking the other two networks.

The South-west Network (Fig. 83)

Szechwan–Yunnan. Within the south-western system the most important link between Szechwan and Yunnan is the highway from Chungking to Kunming by way of Kweiyang in Kweichow province. From Chungking it runs southwards through the Chikiang iron-ore centre, and thence through Tungtze and Tsunyi to Kweiyang. It then turns westwards through Anshun and Puan, crosses the Yunnan border beyond Panhsien, and continues through Kutsing to Kunming. Between Chungking and Kweiyang the road is satisfactory, but the lower part, a section of about 100 miles east of Panhsien, is very dangerous on account of steep grading.

The second main route between the two provinces is the highway which runs from Lungchang on the unfinished Chêngtu–Chungking railway, southwards through Luchow, Pichih, Weining, and Hsuanwei, and then onwards through Changyi to Kunming. This route is shorter and more direct than the first highway, but passes through extremely difficult mountainous country.

The Burma Road. This is the most famous of all the highways connecting with roads or railways beyond the national borders of

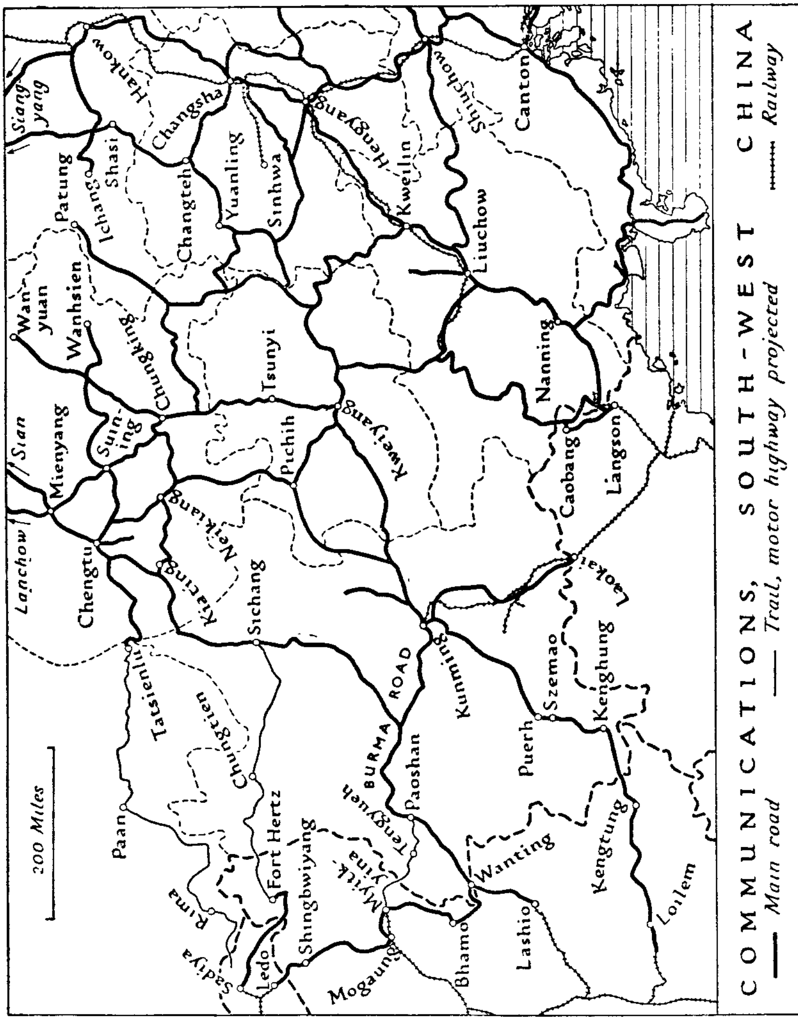

Fig. 83. Communications, south-west China
Based on 1 : 4,000,000. *China Special Strategic Map* (Washington, 1944).

China. It runs west from Kunming to Yunping, and then south-west to Wanting on the Burmese frontier, a distance of 596 miles. From Wanting there are two branches, one bearing north-west for 110 miles to Bhamo on the Irrawaddy river, the other continuing south for 115 miles to Lashio on the Burma railway.

The highway consists of two sections. The first section from Kunming to Siakwan, by way of Anning, Lufeng, Tsuyung, Hsiang-yun, and Fengyi, was built by the Yunnan provincial government

in 1935, but the part west of Lufeng was not surfaced and the bridges were mostly of wood. The work of surfacing the unfinished stretch and rebuilding over a hundred bridges was added to the task of constructing the second section of the road. The latter lies westwards from Siakwan through Yangpi to Yunping, then southwards by way of Paoshan, Lungling, and Mengka to Wanting. Construction was begun in August 1937 ; the road bed and temporary bridges and culverts were completed a year later, and the highway was finally opened to traffic in May 1939. This was a tremendous engineering feat, since the road stretches across some of the wildest and most rugged mountain country in the whole of China. Near Kunming the road traverses comparatively easy country, but when it reaches Lufeng it descends sharply by a series of hairpin bends into the valley of the Lu river, which is more than 2,000 feet below the level of the plateau. West of Lufeng the first real difficulties in road construction were encountered where the road crosses the divide between the Yangtze and Red river basins. This range rises to 9,000 feet, and being flat-topped, the road is carried for several miles along the crest among pine woods and rhododendrons. Westward to Siakwan the terrain is also very rugged, and several high passes are crossed (Plate 116).

Between Siakwan and the Burmese frontier the country is much more difficult than that crossed by the eastern section. The profile section of the road gives an idea of the obstacles which had to be overcome (Fig. 84). The ranges are steeper and higher and the valleys more deeply cut ; and the rainfall is heavier, since this part of Yunnan receives the Indian monsoon from the south-west. The road descends to 4,000 feet to cross the Mekong by a new suspension bridge, and then passes through a tangle of heavily forested ranges dividing various of the Mekong tributaries. Leaving Paoshan, the largest town between Kunming and Mandalay, the road falls sharply to 2,500 feet above sea-level and crosses the Salween river by the Hweitung suspension bridge (Plate 118), after which it rises steeply to over 7,000 feet. Even without air raids the approaches to the Salween and Mekong are the most difficult and dangerous parts of the road, owing to their tortuous and precipitous character, and to the frequency of washouts and landslides. Goods can be ferried across the rivers provided they are not turned into raging torrents by sudden heavy rainfall, as frequently occurs. The building of this second section represents a feat in human endurance achieved by over 15,000 men, women, and children, who were mobilized and set to work, using

mostly only crude implements such as spades, chisels, picks, and baskets. Practically no machinery was used, and even the road rollers were cut out of the solid rock by hand. The majority of the labourers were not only unpaid, but had to provide their own food, and sleep out in the open air through damp, cold nights in malaria-infested territories. During the early stages of the work some 200 out of every 250 workers died of malaria. ' The road is above all things a monument to the real hero of China, the patient, smiling, tireless coolie,' said Richard Watts, one of the first Western travellers along the Burma Road (Plate 117).

Despite certain difficulties the road is highly serviceable in autumn, winter, and spring. In the monsoon season from June to September,

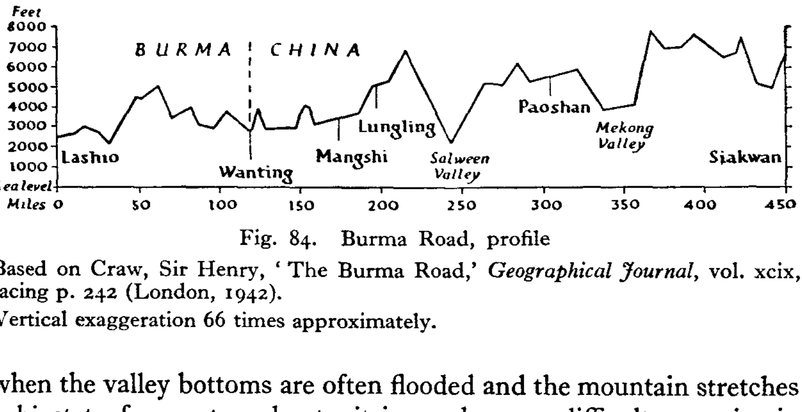

Fig. 84. Burma Road, profile

Based on Craw, Sir Henry, ' The Burma Road,' *Geographical Journal*, vol. xcix, facing p. 242 (London, 1942).
Vertical exaggeration 66 times approximately.

when the valley bottoms are often flooded and the mountain stretches subject to frequent washouts, it is much more difficult to maintain regular services. While the road is liable to considerable damage during the rainy season, it has never been put completely out of commission for more than 48 hours, and it seems that it can be maintained at a reasonable level of efficiency all the year round. In 1940 there were about 60 road-repair stations along the highway, and more than 2,000 men were continuously engaged on maintenance work.

The Burma Road is of vital importance to China both in peace and war, though in recent years its value has been primarily strategic. After the Japanese blockade of the eastern seaboard, and when supplies through French Indo-China stopped after the fall of France in the summer of 1940, it became the only considerable route for goods from British and American sources. The port of entry was Rangoon, whence war materials were transported by railway to Lashio. Even this route was uncertain as was shown when the

British government agreed to close the road from July 17 to October 17, 1940, to the inward transport of munitions, aeroplane parts, and gasoline, though, except for gasoline, very little of these commodities was awaiting transport at Rangoon. In autumn 1941 the traffic was heavy and increasing, the monthly capacity having reached 15,000 tons, as compared with a previous average of 9,000 tons. Thus in spite of its weaknesses and limitations the highway was China's main lifeline, along which she sent troops to strengthen the Allied defence of Burma in early 1942, while in return the United States and Great Britain sent ammunition and war materials into 'Free China' for operations against the Japanese. The fall of Rangoon in March, and the subsequent enemy occupation of the greater part of Burma brought about a marked deterioration in China's military position, and made it necessary to seek new supply routes with the outside world.

The economic function of the road is to foster overland trade between China and her western neighbours, India and Burma. This trade was formerly dependent upon men and animal carriers over what is usually called the northern route through Paoshan and Tengyueh. It seems, however, that the function of the road as a means of developing international trade will lose much of its significance when the Yunnan Railway is reopened and if and when the Yunnan–Burma railway is completed. Its permanent commercial value lies in the fact that it will greatly stimulate local economic development in the region through which it passes.

The India Road. The possibility of building a motor road between China and Sadiya at the head of the Assam railway in India was first given serious consideration after the Japanese occupied French Indo-China. There are two proposed routes which according to recent reports have already been surveyed. The first lies through Tatsienlu (Kangting) and Paan (Batang), and the second and more direct through Sichang (Ningyuan) and Chungtien.

With regard to the route via Paan, the Chinese have, in the face of great topographical and climatic difficulties, built a road from Yaan (Yachow), already connected with Chêngtu, westward to Tatsienlu, a distance of 200 miles. Paan lies 300 miles farther west, over a plateau 14,000 feet above sea-level. Beyond Paan the terrain becomes even more difficult, and in a stretch of about 150 miles as the crow flies, the headwaters of the Mekong, Salween, and Irrawaddy have to be negotiated, while between them intervene high mountain ranges. The route from Paan to the Indian frontier traverses part of

Tibet, and the Tibetans are hostile to the idea of a road through their territory. This, combined with the physical difficulties involved, appears to have led to its abandonment in favour of the second alternative from Sichang across northern Yunnan and a portion of the extreme north of Burma to Assam.

From Kiating in Szechwan, whence communication by the Min kiang is made with Chêngtu, the Chinese have built a road to Sichang, a distance of 325 miles. It is said that the physical difficulties which had to be overcome surpassed those encountered in any previous piece of highway construction. Kiating is 1,640 feet above sea-level and Sichang 5,570 feet; at two intervening points the highway rises to 9,180 feet and 8,530 feet, as compared with 6,560 feet for the highest point on the Burma Road. At these elevations it snows for six to seven months of the year, while it rains most of the time during the warm season. Seven thousand of the road builders lost their lives in less than two years through accident or disease. Food for the workers had to be brought long distances by porters and pack animals.

From Sichang the proposed highway to Sadiya will follow the old pack trail to Yenyuan, Yungning, and Chungtien, threading its way between mountains 8,000 to 12,000 feet high. Beyond Chungtien the road will make a detour south and south-west round a mountain range, cross the upper reaches of the Yangtze, and then continue to Weihai, whence the main pack trail turns northward up the valley of the Mekong. At Tzeku this river can presumably be spanned by a modern bridge if raw materials for it can be obtained. From there the road would cross the Salween, which would also have to be bridged, and thence run to Fort Hertz and Ledo. The country to be traversed between the Salween and Sadiya is very mountainous and crossed by tempestuous rivers. Rain falls throughout the year, but mostly in summer, and the valleys and lower hill ranges are covered with tropical and subtropical rain forests. This proposed route, if ever built, would present a problem of maintenance almost as formidable as that of its construction.

During the summer of 1944 a new highway, known as the Ledo Road, was completed between India and China. Its construction was agreed upon at the Myitkyina Conference in March 1942, and construction was begun from both ends. The road starts at Ledo, the railhead on the Assam railway, and following the Hukawng valley, passes through Maingkwan and Kamaing, and eventually reaches Mogaung, a total distance of 250 miles. Connexion is then

Plate 113. The Changsha–Hengyang motor road
A cutting near Changsha on a section of the Loyang–Kwangtung highway.

Plate 114. Road bridge near Changsha
A new bridge on the Changsha–Ningsiang section of the Loyang–Kwangtung highway.

Plate 115. Motor road near Chungking

Much construction of new roads has taken place in the Chungking area since 1937.

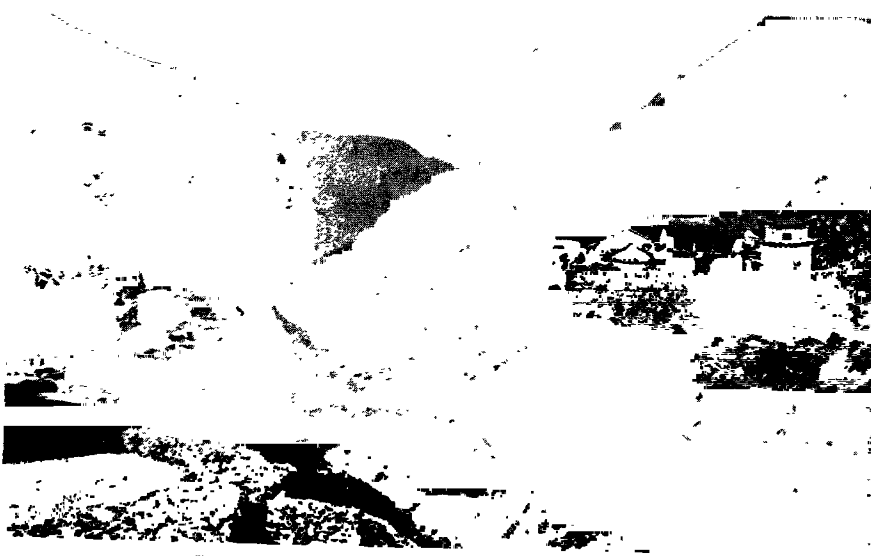

Plate 116. Burma Road near Siakwan, Yunnan

From Siakwan westward the Burma Road runs through difficult country, and is here seen skirting the edge of a small gorge. A small fortified settlement commands the gorge.

made with Myitkyina and Bhamo, where it joins a branch of the Burma Road, which leads to Wanting on the Sino-Burmese frontier.

Puerh–Kunming Road. The road from Kunming south-westward to Puerh and thence via Szemao and Kenghung to Kengtung in the Burmese Shan States, the terminus of a motor highway running east from Loilem, is a line of communication second in importance only to the Yunnan–Burma highway itself. It has always been a considerable trade route, since it passes through the fertile valleys of the 'Twelve Pannas,' a confederacy of twelve Shan principalities, and then leads on to through Kengtung, west to Burma, and south to Siam. In recent years the Chinese have done much to improve this route, though its standards remain far below that of the Burma Road, which, because of its proximity to the Lashio railhead, was given priority of attention. The road by Puerh is the main line of communication for Chinese units which may operate in the southern Shan States or the Twelve Pannas. Japanese forces could have advanced towards Puerh either from Burma via Loilem and Kengtung, or from Siam by the motor road which runs from the Bangkok–Chiengmai railway to Chiengsen on the Mekong, and is thence linked by an inferior road with Kengtung.

Sichang–Hsiangyun. The construction of this highway linking Sichang in Sikang and Hsiangyun in Yunnan began in December 1940. Branching off the Burma Road west of Kunming, it runs almost due north through difficult mountain country. The road assumed considerable importance in the fighting along the Burma Road in 1942.

Kunming–Hokow. This line, which lies between Kunming and Hokow, the Chinese frontier town opposite Laokai, was built in 1940 to supplement transport over the Yunnan railway. It lost its value as soon as the Japanese occupied French Indo-China.

Hochih–Caobang. The road between Hochih on the Kweichow–Kwangsi railway to Caobang in French Indo-China was completed in 1940. It took the place of the Nanning–Chennankwan highway when Nanning fell into Japanese hands.

Canton–Hong Kong. Another international connexion built during the war is the Canton–Hong Kong highway via Shumchun, which served as a feeder or supplementary line of the Canton–Kowloon railway before the loss of Canton. The length of this highway is 101 miles.

The North-west Network (Fig. 85)

Chinese-Soviet Highway. In the north-west the backbone of the domestic transport system and the only route of international importance is the Chinese-Soviet Highway. It covers a total distance of 2,140 miles, and is one of the longest highways in the world. There are five sections with termini at Sian, Sinsinchia, Urumtsi, and Tachen on the Sinkiang-Soviet border, where it links up with a Russian highway leading to Sergiopol on the Turksib railway. The Lanchow–Sian section has been surfaced and improved, with the result that travelling time is now reduced from six to four days. The stretch from Lanchow to the Kansu–Sinkiang border is well surfaced throughout; the remainder is unsurfaced, but is good except in heavy rains, which are, however, infrequent in the area.

In the early years of the Sino-Japanese war considerable amounts of war materials were being transported along this highway. According to reports in 1940 Russian trucks with Russian drivers and mechanics were coming in convoys of 10 to 50 every few days from the Turksib railway, and making the trip to Lanchow in two weeks. As in the whole of ' Free China ' the fuel problem has always been serious, and although the production of the Yumen district has helped to ease the position, most of the trucks are run on Russian gasoline. Camels and mules are also playing an important part, especially on the route between Lanchow and Sinsinchia. A rough estimate of the total traffic over the Chinese-Soviet Highway would seem to indicate that one-third is going by truck, whilst two-thirds are going on coolie back, by mules, and by camels.

Lanchow is one of the most important route centres on this highway. An important road leads northwards through Ninghsia and Tengkow, and thence to Peiping via Paotow and Kalgan. Another lies westwards to Sining and Tahopa, whence a highway is projected along the old caravan route across Sikang to Tali in Yunnan.

The Chinese-Soviet Highway has considerable economic and political significance. Not only is it the main link between China Proper and the remote province of Sinkiang, but it is also the only overland route with the U.S.S.R., which cannot be cut by attack from the east in war-time. In peace it provides an important means of co-ordinating the development of Sinkiang with that of the rest of China.

Sian–Chêngtu. From Sian, newly completed highways spread out in many directions: north-eastward to Shansi; northward through

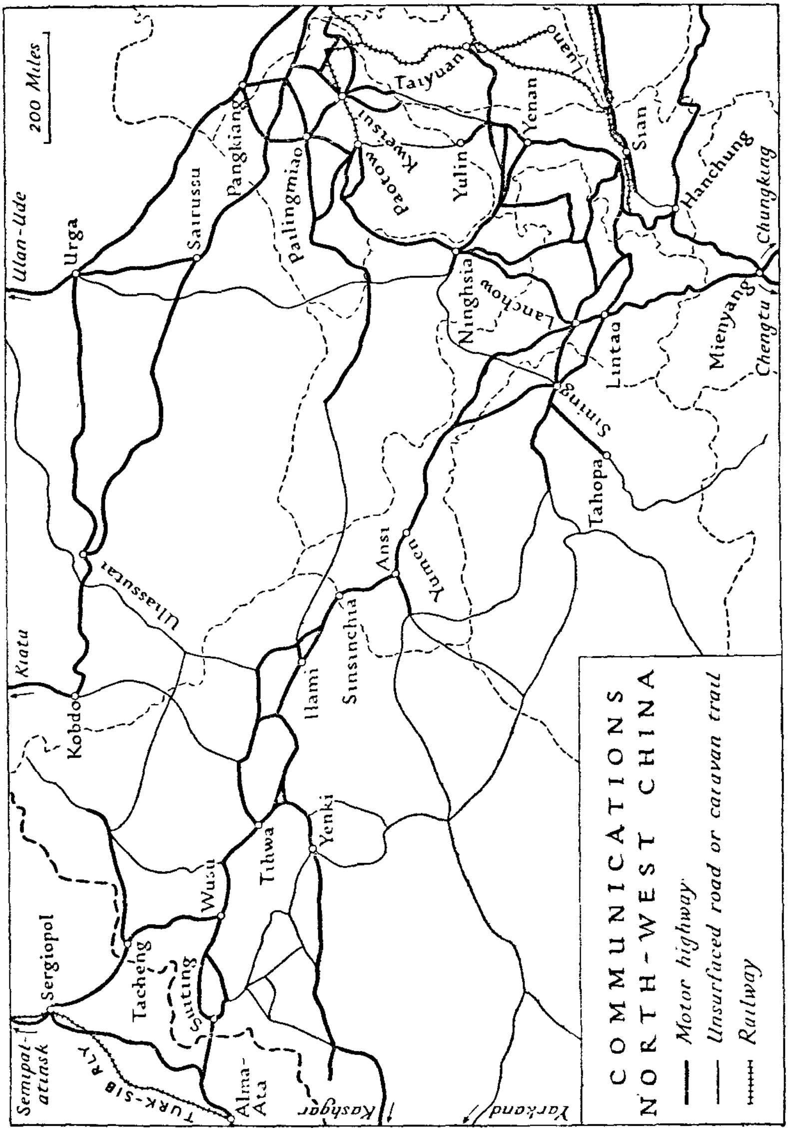

Fig. 85. Communications, north-west China

Based on official sources.

Yenan and Suiteh to Yulin; eastward to Loyang; and southward through Paoki and Hanchung to Chêngtu. The Sian–Chêngtu road is especially important, since it crosses by means of high passes the great natural obstacles formed by the Tsinling and Tapa shan. Before the old dirt road was converted into a modern highway it was for

2,000 years regarded as one of the chief strategic lines of transport and communication in China. The new road was completed before the war, but it is still too narrow and requires widening over considerable stretches. Nevertheless there is a constant stream of lorries, mules, and wheelbarrows moving over it, and at the present time it constitutes the main link between the north-west and the south-west.

In addition to this route, two other connexions are being built between the north-west and south-west. The first lies far west of Sian and Hanchung, and will run from Lintao in Kansu along the Tao and Peiling rivers to Kwangyuan in Szechwan ; according to some reports parts of this road have been completed. The other is to lead directly from Hanchung to Chungking, following a course parallel to the Kialing kiang most of the way. This will lessen by half the distance from Hanchung to Chungking, a matter of 630 miles via Chêngtu.

Neikiang–Kiating. This 118-mile highway runs from Neikiang to Kiating via Tzeliutsing. Crossing through central Szechwan it connects with the Chungking–Chêngtu and the Kiating–Sichang trunk lines. It was completed by the end of 1940.

Vehicles and Technicians

In spite of considerable war-time achievements in highway construction, the transport problem in China is now acute. The networks which have been built up in the south-west and north-west are fairly extensive, but it appears that the greatest possible use has not been made of them. The basic causes of the present *impasse* are the shortage of vehicles, especially motor cars and trucks, the necessity of rationing gasoline, the scarcity of good drivers and repair technicians, and finally the lack of experience in traffic management.

The lack of spare parts and new trucks and engines is now even more serious than the lack of an efficient fuel, especially when it is realized that the average life of a truck on the roads of ' Free China ' in the days when the Burma Road was open was not much more than a year. The Government and private interests have been primarily concerned with stimulating imports of vehicles from abroad, but this has become almost impossible, as one by one the vital supply routes have been cut. The situation continues to deteriorate as reserves and resources are used up.

The following table shows the number of motor vehicles registered from 1936 to 1940 (see also p. 440):

Motor Vehicles Registered, 1936–40

On Jan. 1	Passenger Cars	Trucks	Buses	Motor-cycles	Total
1936 . . .	27,465	11,917	8,060	2,135	49,577
1937 . . .	25,343	10,406	7,112	2,077	44,938
1938 . . .	20,344	11,446	5,625	1,545	39,861*a*
1939 . . .	18,370	23,629	3,197	1,891	47,813*b*
1940 . . .	26,893	34,833	3,616	3,074	70,267*c*

a—includes 901 Diesel units
b—includes 726 Diesel units
c—includes 1851 Diesel units

Source: Greene, K. R. C., and Phillips, J. D., *Transportation and Foreign Trade in the Pacific*, p. 44 (New York, 1942).

The shortage of drivers and technicians has been offset by recruiting volunteers from overseas Chinese, considerable numbers of whom have returned to China from British Malaya, the Netherlands East Indies, the Philippines, and the United States in recent years. The lack of traffic administrators has been partly remedied by the use of American experts, who have entered the country in considerable numbers since the outbreak of the Pacific war in December 1941. A problem which will have to be faced in the future is concerned with freight rates, which are far too high. For example, air freight charges from China to Rangoon before the Burma Road was cut were only 50 per cent. greater than the truck rates. Owing to the high cost, motor transport is at present available only to the military, government officials, and the rich. Before it can play a major role in the development of the national economy it must be brought within the reach of the small trader and the farmer by a large reduction of rates.

In view of the scarcity of motor vehicles and gasoline supplies it was deemed expedient in 1939 to inaugurate a Stage Transport Administration, using rubber-tyred carts pulled by horses, mules, camels, and sometimes coolie labour. It is calculated that a rubber-tyred cart, pulled by two or three horses in the north-western provinces, is capable of travelling 12 miles a day with a cargo of 1½ tons. In 1941, 7,165 such vehicles were in use, in addition to other means of transport pulled by beast or human labour. Six national stage

transport lines have been opened, totalling 5,620 miles; branches under provincial administration measure 11,980 miles. Plans are under way to bring India into this system. It takes four months by stage transport to Lhasa via Tatsienlu. Two to three thousand tons of goods can be carried each time, but only about two trips can be made in a year. A Sinkiang–India stage transport line is also under consideration.

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3. Various aspects of Chinese roads are treated from time to time in: Woodhead, H. G. W. (editor), *China Year Book* (annually, Shanghai); *Chinese Economic Journal and Bulletin* (monthly, Shanghai); and *Far Eastern Review* (monthly, Shanghai).

4. A useful map is 1 : 2,000,000 Asia, Transportation Map, 4 sheets (Washington, 1944).

Chapter XI

RAILWAYS

Conditions up to 1937: Historical Background; Technical Features; Traffic; Geographical Description.

War-time Developments, 1937–44: Railways in 'Free China'; Railways in Occupied China; A Post-war Programme.

Bibliographical Note.

CONDITIONS UP TO 1937

In spite of her huge extent, her long history and teeming population, China had only 9,773 miles of railway at the beginning of 1936, and of these 3,726 were in Manchuria. Since then and up to December 1942, 2,263 miles of new railways have been built in China and Manchuria, making a grand total of 12,036. This means that the whole of China (including Manchuria) has only 27 miles of railway to each million of her population, as compared with 437 for Great Britain, 1,940 for the United States, 550 for Germany, 163 for British India, and 190 for Japan. Against China's 274 miles of railroad to every 100,000 square miles of territory, Britain has 21,360, the United States 7,970, Germany 20,150, and Japan 9,120 miles. The mileage of China is therefore extremely small in comparison with that of other countries, and large-scale railway development will be one of China's greatest economic and political needs after the war.

The slow development in the past accentuates all the more the needs of the future. Prior to 1932 railway construction lacked coordination and has been carried out primarily to meet the requirements of foreign trade and commerce. Three main hubs could be distinguished with their respective centres at Peiping, Shanghai, and Canton. As Peiping had for centuries been the capital of the country and Tientsin its harbour, many of the early lines were built radiating from this hub, giving it excellent rail facilities. The principal railways starting from Peiping and Tientsin were the Peiping–Mukden leading north-east to Manchuria; the Peiping–Suiyuan north-west to Mongolia; and the Peiping–Hankow and the Tientsin–Pukow, which both afforded effective connexion between the North China Plain and the Yangtze valley. The great economic metropolis of Shanghai formed another railway centre, though much smaller in magnitude than that of Peiping and Tientsin. Lines extended

south-west to Hangchow and west to Nanking, where a ferry provided connexion with the Tientsin–Pukow railway. Canton formed the third and least important centre: the mountainous character of the south had retarded railway construction, which had largely kept to the plains of North and Central China. There was no proper connexion between the southern and western provinces of Kwangtung, Kwangsi, Kweichow, Yunnan, and Szechwan and the provinces of the north.

Historical Background

The history of Chinese railways has been closely bound up with the political vicissitudes of the country, and has been characterized by a dramatic change of attitude, from the marked indifference and opposition of the old regime to the feeling of the necessity to build up a system of national railways under the Kuomintang. Early development was almost entirely due to the enterprise of foreigners. One of the first efforts was made in 1876 when Jardine, Matheson and Co. completed the construction of the Shanghai–Woosung railway, 10 miles in length, on a 2 ft. 6 in. gauge. From the start the local population were obstructive, and their opposition increased when an accident occurred in which a Chinese soldier was killed. Eventually the provincial authorities acquired the railway, and in 1877 the lines were torn up and transported to Formosa.

The Nineteenth Century (1879–1902)

In 1879 a small number of influential Chinese, of whom Li Hung-chang and Chang Chih-tung were particularly far-sighted, obtained the imperial sanction to construct a mineral line for transporting coal from Tangshan to Hsukochwang, whence a canal led to the sea. This line came into operation in 1881 and was so successful that the authorities agreed to its extension, and a company was organized which continued the line first to Lutai, and later, in 1888, to Tientsin. The new construction, however, was beyond the financial capacity of the company and the government was forced to intervene. The railway with its staff, both British and Chinese, was taken over by the state, and the Imperial Railways of North China formed. By 1894 the line had been completed to Peking in the north-west and had been extended well beyond Shanhaikwan in the north-east.

The Sino-Japanese war (1894–95) made heavy inroads on the state resources, and this, combined with the continued reluctance of

Plate 117. Burma Road, Salween valley
The Burma Road climbing tortuously out of the deep trough of the Salween river.

Plate 118. Hweitung suspension bridge, Yunnan
This bridge carries the Burma Road across the Salween river.

Plate 119. Changte (Anyang) railway station
A passenger train at Changte station in northern Honan on the Peiping–Hankow line.

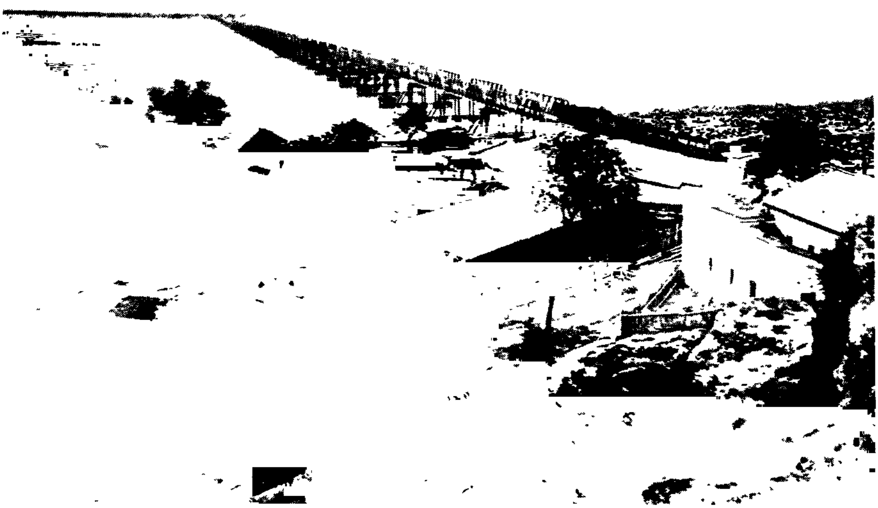

Plate 120. Railway bridge over the Hwang ho
The Peiping–Hankow railway crosses the Hwang ho north of Chengchow by a bridge 2¼ miles long. Trains were restricted to a speed of 8 miles per hour over the bridge, which was destroyed early during the Sino-Japanese war.

Chinese capitalists to invest in railways, caused the government to enlist the aid of the Hong Kong and Shanghai Bank in the flotation of a foreign loan. Under the terms of the loan agreement key positions were to be held by British nationals so as to ensure administrative and financial efficiency, though the general control remained nominally in Chinese hands. This original agreement concluded between the Chinese government and the Hong Kong and Shanghai Bank, as the agent for the foreign bondholders, became a model which was followed in many subsequent negotiations.

So seriously did the Sino-Japanese war weaken China that the empire seemed in danger of disintegrating, and each Great Power manœuvred to prevent the other Powers from seizing part or all of it. This prepared the way for the period of intense foreign pressure, described as the ' Battle of the Concessions ' (see vol. ii, pp. 51–61). In so far as railways were concerned, the Powers saw that concessions were not only politically, but economically, attractive. Competition in this sphere was, therefore, exceptionally keen, and several of China's major railways came into existence as a result. The Imperial government turned first to Czarist Russia, the power which had helped to limit Japanese influence in Manchuria. The defensive alliance which followed provided for the prolongation of the Trans-Siberian railway across Manchuria to Vladivostok. A Russo-Chinese bank was organized and the line, later known as the Chinese Eastern Railway, was constructed on a bond issue under a loan agreement which followed. It was also decided to build a railway (South Manchuria Railway) running southward from Harbin to join up with Dairen (Talienwan) and Port Arthur in the Liaotung peninsula.

After 1898 great pressure was exerted upon the Chinese government to permit the construction of lines in the spheres of interest of the countries concerned. Great Britain, by means of a loan for the completion of the Peking–Mukden line, gained virtual administrative control in this enterprise, and also obtained the right to construct several lines radiating from Shanghai. Belgian financiers, in combination with French and British interests, received permission to build the Peking–Hankow railway, while the southern section of the trunk line between Hankow and Canton was placed in American hands. Meanwhile, Germany and France had not been inactive in other parts of the empire. In Shantung, Germany got the exclusive right to build a railway between Tsingtao (Kiaochow) and

Tsinan. Similarly, France was granted the lease of Kwangchowwan and also obtained valuable railway rights, including the concession for the Yunnan Railway, in the provinces of south-western China. While China undoubtedly derived a number of benefits from the introduction of this modern form of transport there were many disadvantages. The total result was the unsystematic construction of main trunk lines by the concessionaires, ostensibly to foster trade with China but in reality to further politico-economic ambitions and build up spheres of influence. The railways became the embodiment of conflicting interests among the Powers and were conspicuous by their lack of co-ordination and balance. They were in fact lines of penetration starting from the treaty ports and practically confined to the eastern provinces.

The Twentieth Century up to 1928

Following the Boxer rebellion, which was partly a manifestation of the resentment caused by these concessions, China's position gradually improved. It was generally agreed that railway construction and operation within China Proper should be kept out of the sphere of world politics and that concessions should be permitted strictly on a commercial basis, the concessionaires receiving only such support from their governments as would enable them to safeguard their legitimate interests. In all agreements negotiated the safeguarding clauses (employment of foreign staff, disposition of funds, etc.) became less onerous year by year, and ownership of the lines was vested in the Chinese government. After 1908 all administrative control was likewise retained. The successful completion of the Peking–Kalgan line (now the Peiping–Suiyuan railway), which was constructed entirely by Chinese engineers and capital, served further to stimulate Chinese activity. Enterprising officials and gentry, using native resources, organized semi-private companies to construct and operate lines of varying length and importance. Often, however, the promoters were without business experience and the concerns were poorly organized and financially unstable. In 1911 an edict laid down that all trunk lines were to be taken over by the Imperial government, private and provincial enterprise being limited to secondary lines. Opposition to the edict brought together all the elements hostile to the Manchu regime, and was one of the main causes of the Chinese Revolution of 1911–12 (see vol. ii, p. 40).

The effect of the revolution on railways was not great, and after a

short pause the flow of foreign materials for railway construction was actually accelerated. By 1914, over 3,000 miles of railways had been built, and the main outlines of the present system began to take shape.

The war of 1914–18, however, led to a complete cessation of foreign loans, and its aftermath of financial confusion prevented any renewal of interest in Chinese railways. In the meantime China had begun the long period of civil strife between rival warlords which threw the whole country into a state of chaos. Railways suffered severely during these years, and foreign railway officers, whose dual rights under the loan agreements were to safeguard the interests of the Chinese government and those of the foreign bondholders, found themselves in a very difficult position. They were often replaced by military and political nominees whose knowledge of railway matters was negligible. Profits began to decline and defaults on bond payments were frequent, but protests from foreign bondholders failed to bring about any improvement in the situation.

Railways under the National Government, 1928–37

In 1928 the National Government began to turn its attention to the problem of railway reconstruction and set up a separate Ministry of Railways under Sun Fo, son of Dr Sun Yat-sen. The new organization was confronted with a most complex and difficult situation. The majority of the railways were in a condition little short of chaotic, and a large outlay was necessary to keep them in operation at all, yet money could only be obtained on the most exacting terms. The form of capitalization of the railways was an additional handicap since, being a bond and not a share indebtedness, it was rigid and made no allowance for periods of depression. The Ministry, in its efforts for rehabilitation, therefore fell back on two financial expedients: the raising of internal loans and the use of railway revenues. The former consisted of short-term loans from local banks, since the big banks did not at this time consider that the railways constituted a sound investment. As a result, a high proportion of annual income was absorbed by heavy short-term liabilities. The use of railway revenues for reconstruction was a more natural step, and was facilitated by the willingness of many bondholders to take a broad view of the position and forego their interest payments. Against this, however, the loss of Manchuria and the Shanghai incident (1932), which resulted in great damage to the

Nanking–Shanghai railway, were further setbacks, and it was not until 1935 that revenue exceeded the 1931 level.

The task of rehabilitation was therefore a very difficult one, and was carried out under very unfavourable conditions. The railways remained choked with unserviceable locomotives and rolling stock. Most of these would have been uneconomic to repair had new capital been cheaper, but as it was, repairs could be carried out only as opportunity offered. The scarcity of locomotives and rolling stock was also limiting earnings very considerably and, in addition, many wagons were under military control. Engines were on an average unable to pull more than 50 per cent. of their normal load; railends were battered and often had a permanent set, having low joints and high centres which refused to yield to treatment. The net result was that China's international credit was further depressed. There were defaults on the foreign debt services, and had this continued, repudiation of some sort would have been hard to avoid, since the only alternative would have been an external loan on such exacting terms that its full observance would have been difficult.

Fortunately, at this time the trustees of the remitted British Boxer Indemnity Fund began to invest on a large scale in Chinese railways. A fund was instituted from which grants were made for the purchase of materials for railways and other purposes in the United Kingdom. The bulk of these credits were used for the completion of the Canton–Hankow railway, which had been under construction for nearly forty years, but had never been completed, while the remainder were applied to the purchase of materials for the Tsingtao–Tsinan, Tientsin–Pukow, Peiping–Mukden, Chekiang–Kiangsi lines, and the Nanking–Pukow train-ferry. The help given by the Board of Trustees greatly increased public confidence. For the first time the banks began to regard railway investment in a more favourable light, especially as, in the case of the Hangchow–Yushan line, they were often in partnership with the Board of Trustees. Moreover, the gradual emergence of the world from the economic depression caused renewed interest in China as a field for investment.

The reconstruction and expansion of the railway system now proceeded apace. The clearance of the Communists from Kiangsi made possible the extension of the Hangchow–Yushan line westward into that province. It was financed partly by the provincial government and partly by a loan from German sources. The Lunghai Railway was further extended, and in 1934–35 a line was built

between Nanking and Wuhu where it connected with a railway to Sunkiapu. The interesting point about this line is that it was built by a Chinese railway company financed by Chinese banks. Another indication of the reviving confidence in Chinese railways was the agreement between the British and Chinese Corporation and the Ministry of Railways for the issue of a new loan for the construction of the final section of the Shanghai–Hangchow–Ningpo railway to link up the two latter towns.

Although the revival of confidence, mainly a result of the action of the Board of Trustees, had considerably eased the position of the railways, the burden of debt grew steadily, and the possibility of repudiation remained. It was at this time that General Hammond came to China to report on the condition of the railways to the government. His remarks and recommendations during this visit gave the officials greater self-confidence. Soon afterwards the position was further improved by the visit of Sir Frederick Leith Ross, who was instrumental in initiating some of the conversations which resulted in the revision of loan agreements and contracts. The various railways were thus enabled gradually to pay off remaining arrears.

Foreign Loan Consolidations for Chinese National Railways to 1 January 1937 (thousands of dollars)[1]

Railway lines	Loan principal before consolidation	Unpaid interest before consolidation	Principal to be paid after consolidation	Interest to be paid after consolidation	Reduction of loan obligation
					%
Peiping–Suiyuan	5,500	17,509	5,500	5,500	52·19
Taokow–Tsinghwa	10,575	6,942	10,575	1,938	28·57
Tientsin–Pukow	102,970	60,716	102,970	12,143	29·67
Lunghai	115,996	72,595	115,996	Cancelled	38·49
Canton–Kowloon	18,896	9,920	18,896	1,984	27·54
Total ..	253,936	167,682	253,936	21,016	34·66

Source: Cheng Han-seng and Farley, Miriam S., 'Railway Strategy in China,' *Far Eastern Survey*, vol. vi, p. 169 (New York, 1937).

This was a very satisfactory arrangement since it ended ideas of repudiations, such as had been entertained by extremist opinion,

[1] Except where otherwise stated, 'dollars' refers to Chinese National Currency dollars.

which held that railway loans had been forced on China against her will, and that she was under no moral obligation to repay them.

The worst of the crisis was now passed, and the government turned to the problem of expansion. In 1935 and 1936 many new lines were planned and some were actually constructed. Practically all the new railways were being built under the direct or indirect auspices of the Ministry of Railways, working in close co-operation with provincial governments and with the Chinese modern banks. In many cases a semi-official company was organized for the construction and operation of the railways; for example, the Kiangnan Railway Company for the Nanking-Kiangsi railway. Regulations issued by the Executive Yuan in 1935 provided that private railways could be incorporated only by Chinese nationals, foreign shareholding being prohibited; foreign loans were to be approved by the National Government and debenture issues were not to exceed the total assets; franchises were limited to thirty years from date of completion, after which the lines were to be repurchased by the government. The official policy was to encourage the investment of Chinese capital so far as possible, using the government-controlled banks to draw in other private funds.

Borrowing from abroad could not, however, be entirely dispensed with, and foreign loans were necessary in order to carry out the government's ambitious plans. Fortunately, China was now in a much better position to elicit help from outside. The readjustment of the old loans, together with the improvement of railway revenues, the reorganization of the currency in 1935 and general progress towards financial stability, had the desired effect of attracting foreign investors. But the Chinese government in the light of past experience determined to acquire loans only on certain conditions. In the major undertakings, where Sino-foreign financial interests were concerned, the government stipulated that 51 per cent. of the share capital should be held by nationals and stressed the necessity for a greater executive and directive control for the Chinese shareholders. This implied that foreign financial interests were to be given a measure of security to enjoy their due profits, but that they should not be allowed to carry out political penetration. Under these conditions foreign loans were admitted and a feature was the frequency with which Chinese and foreign capital participated jointly in the financing of new lines. There was also keen competition among the firms for the privilege of supplying raw materials for railway projects.

Railway Debts, 1 January 1937

Debt		Equivalent in Chinese Currency
British (£)	28,656,293	477,413,841
Japanese (yen)	93,600,000	90,873,388
French (francs) ..	49,084,887	7,781,864
Belgian (francs) ..	587,743,000	67,472,896
Dutch (guilders) ..	30,750,000	57,401,531
U.S. ($)	3,943,393	13,399,229
Customs Gold Units [1]	2,331,000	5,328,666
Chinese ($)	236,105,272	236,105,272
Total		955,776,667

Conversion at average rates for December 1936. Obligations in the currency of foreign countries are not necessarily held by nationals of that country.

Source: Chen Han-seng and Farley, Miriam S., ' Railway Strategy in China,' *Far Eastern Survey*, vol. vi, p. 169 (New York, 1937).

An example of a joint Sino-British loan was the flotation in 1936 of a £1,000,000 6 per cent. sterling bond issue, the proceeds of which were to be used for the completion of the Shanghai–Hangchow–Ningpo railway and the construction of the Tsientang river bridge. The loan was underwritten by a syndicate composed of the British and Chinese Corporation, represented by the Hong Kong and Shanghai Banking Corporation and Jardine, Matheson and Co., and the Chinese Development Finance Corporation. German interests participated heavily in financing the Chekiang–Kiangsi railway and its projected extension through Hunan to Kweichow, their advances taking the form of railway materials. Belgium, like Britain, arranged to use her Boxer Indemnity funds to finance the sale of railway equipment, mostly for the extension of the Lunghai Railway, originally constructed with Belgian aid. In December 1936 the China Development Finance Corporation and the *Banque Franco-Chinoise pour le Commerce et l'Industrie* entered into an agreement for the financing of the Chungking–Chêngtu railway in Szechwan. Czechoslovakia and U.S.A. also helped in the financing of construction.

The problems of railway construction had been very considerable during this period (1928–37) and they had been almost entirely problems of capital. But in contrast to the experience of the late

[1] See p. 197.

nineteenth century all initiative for foreign loans came from China. The Ministry of Railways was throughout the prime mover in planning most of the lines and the execution was largely in the hands of the Ministry itself or of Chinese companies organized under its auspices. Foreign credits were sought by China to carry out her own designs rather than pressed upon her to further the ambitions of others.

The National Government in the brief period before the Sino-Japanese war had thus made sustained efforts to offset the hitherto uneven railway development by pushing forward the construction of trunk railways which would open up the interior of their country. This was also the beginning of a system geared to the imminent requirements of national defence. By 1937 important new lines had been built and work had started on many others. It was intended that when these were completed there would be three main trunk lines running from the northernmost to the southernmost provinces and three lines crossing them from east to west. The completion of the Canton–Hankow railway by the building of the Chuchow–Shiuchow section in 1936 made through connection possible for the first time from Peiping to Canton and Kowloon and so to Hong Kong. East of Peiping–Canton line there was to be a second continuing the Tientsin–Pukow route through Anhwei, Kiangsi and Fukien, terminating at Chaochow (Chaoan) on the Fukien coast. To the west there was to be a third line running from Tatung on the Peiping–Suiyuan railway in north Shansi to Tungkwan on the Lunghai line, following the latter westward to Paoki (Shensi), then branching west through Szechwan, Kweichow, and Kwangsi to the coast at Yamchow.

On the east-west routes, extension of the Peiping–Suiyuan line into Ninghsia and the Lunghai Railway from Paoki to Lanchow was under consideration. Most important, however, was a projected new southern trunk line from Ningpo on the coast of Chekiang through Chekiang, Kiangsi, Hunan, and Kweichow to Kunming, completed to Chuchow in 1936. These developments, it was hoped, would further the process of military and administrative unification as between Central China and the south-west, and also between the coastal provinces and the interior. No less important was the fact that new trade routes would be established and the agricultural and mineral resources of vast new areas, hitherto remote and inaccessible, would be opened up for exploitation.

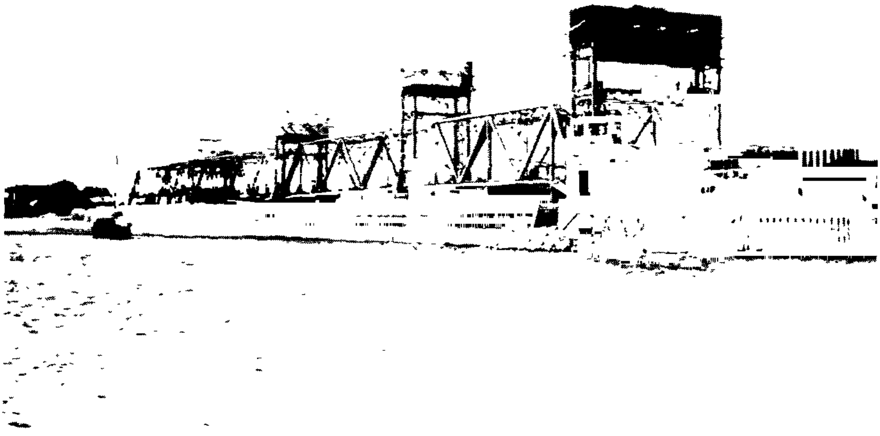

Plate 121. Train ferry, Nanking

This train-ferry links the Tientsin–Pukow and Shanghai–Nanking railways. A view of one of the bridge approaches, showing the guiding arms, central cabin, and control towers.

Plate 122. Railway bridge near Tsinan

The Tientsin Pukow railway crosses the Hwang ho near Tsinan by a steel bridge.

Plate 123. Railway bridge, Peiping–Mukden railway

The bridge over the Lwan ho on the Peiping–Mukden line between Tientsin and Shanhaikwan.

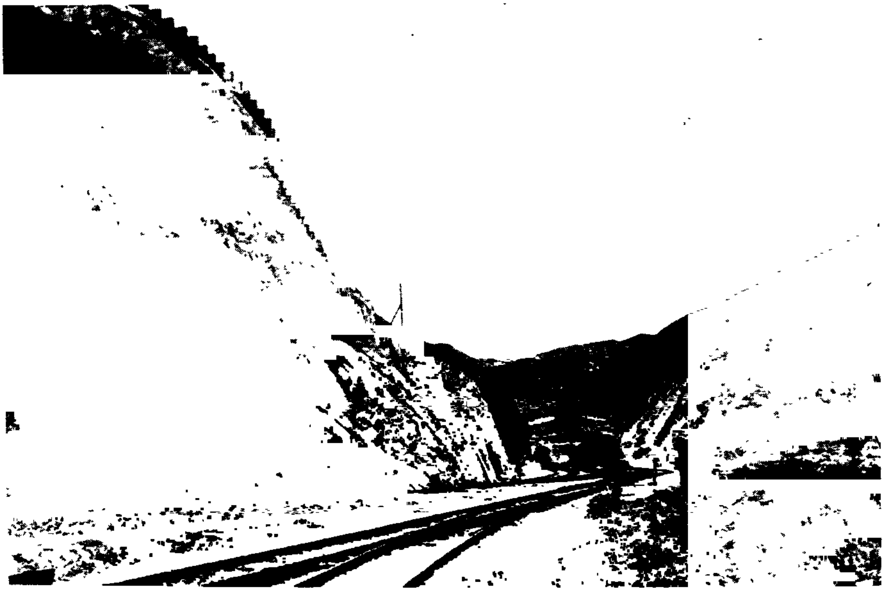

Plate 124. Nankow pass

The Peiping–Suiyuan railway here makes its way through the Great Wall, which can be seen on the hillside at the left.

Technical Features

The Permanent Way

Nearly all the railway network in China is single-track except for a few sections on the main routes. Before the Sino-Japanese war the standard gauge was 4 ft. 8½ in. with the exception of the Chengtai Railway and the Yunnan Railway, both of which had a metre gauge.

In 1936 the main need was for new sleepers. Owing to the high cost of hardwood on creosoted softwood, untreated softwood was used in the majority of cases, though it was known that its life would not exceed about eight years, and in some districts three years. The cleanliness of the ballast had a considerable effect upon the life of the sleepers, but frequently the old sleepers were so rotten that, if the ballast had been dug out for cleaning, they would have fallen to pieces. During the eighteen months prior to the war important repair work was carried out, and it is estimated that about 1,500,000 sleepers were renewed over the whole of the network.

The rails were also in a state of disrepair, and in many cases were those which had been laid when the line was first built. Very often the running surface of the rail instead of being a curve was worn completely flat, the railends were battered, and the fish-plates could no longer span the web of the rail and hold the joint solid by wedging themselves between the head and foot. By 1937, however, new rails had been laid over many sections, and where this was not possible, a start was made in shimmying the fish-plates and raising the rail joints.

The repair and renewal of bridges was more urgent than the renewal of rails. During the civil wars many of them had been destroyed, the broken spans jacked up and mounted on sleeper stacks, and often destroyed again. Numbers of bent and damaged girders were removed and straightened and patched; others had to be replaced. To provide material, bridges over watercourses normally dry were replaced by tracks laid across the bed of the water course with stone dressing. In this way a number of extra spans were obtained which were used either whole or in parts. Much of this work would never have been undertaken had capital been cheaper, since it would have been more economical to replace the broken spans with new and stronger bridges.

In China the rails on most lines have always been stronger than the bridges, and as a result the limit to locomotive size is not axle

load but its effect on a bridge of a certain strength. In construction work carried out before the war it was customary to take a certain Cooper loading; this is an American loading very similar to the British Engineering Standards Association's standing loadings. In 1937 the Tsingtao–Tientsin railway bridges over the Mi and Tze rivers were both built to Cooper's E-50 loading standard, the former measuring 315 yards and the latter 494 yards in length.

Rolling Stock

By 1936 the work of repairing existing locomotives and rolling stock was well in hand, but there was still an urgent need for new equipment. While there were facilities for repairs to locomotives and wagons there were hardly any for manufacture. The government accordingly placed orders in 1934, 1935, and 1936 for modern locomotives, passenger coaches, goods wagons, equipment for repair shops and other general railway material, with various countries. The order included the purchase for the Canton–Hankow railway of 28 British locomotives, of which 24 were of the 4–8–4 type and 4 of the 0–8–0 type, and 20 American locomotives of the 2–8–2 type.

China's Imports of Railway Materials [1]
(thousands of Customs Gold Units)

	1932	1933	1934	1935	1936
Great Britain	1,923	2,708	4,968	2,571	6,273
Germany ..	2,368	1,194	1,198	7,996	2,182
Belgium	391	259	520	1,004	4,279
France	186	414	2,135	963	2,166
Japan	747	35	55	47	1,367
United States	637	258	827	1,004	795
Total including others	6,417	4,932	10,015	9,659	19,731

Source: Cheng Han-seng and Farley, Miriam S., 'Railway Strategy in China,' *Far Eastern Survey*, vol. vi, p. 169 (New York, 1937).

The rolling stock at the end of 1936 on the national railways as a whole is given in the following table; for the sake of comparison corresponding figures for Belgium, which has a highly developed railway system, and for British India are added:

[1] Locomotives and tenders, railway and tramway carriages and wagons, ungalvanized rails and 'railway and tramway materials not otherwise recorded.'

	China	Belgium	British India
Locomotives	1,243	3,592	9,036
Passenger	299		
Goods	704		
Shunting	240		
Passenger coaches	2,071	7,255	20,094
Goods wagons, all types ..	15,482	116,373	224,803

The standardization of rolling stock as between the various systems began in 1920 and was continued by the Ministry of Railways after 1928. The latter did not adapt a rigid standard, and at first standardized only such essential parts as tyres, bogie trucks, and brasses, whilst for locomotives, the policy was to adopt standard boilers, wheel-centres, axle-boxes, piston-valves, etc., which in time would approach nearer to a standard engine. It was considered that the wide differences in conditions, climate, and grade, inevitable in a large country like China, made it necessary to vary the type to each case, as well as to suit the loads to be hauled and the speed.

At the same time the Ministry tried to incorporate the latest improvements into locomotives where conditions were favourable. High steam pressure, high superheat, large boiler, big grate area, large main steam pipes, and other modern points were observed. In passenger traffic the all-steel carriage was adopted for main-line stock, though a secondary standard with steel frame and wooden body was permissible for branch lines. The standard bogie truck adopted was of the American type, and, while costly, was found to give excellent results. The standard wagons in use were of the 40-ton type. Their design dated back to 1921, and though improvements were embodied in later designs, it was not considered desirable to alter the standard in any way. The wagons were of four types : covered, high-side, low-side, and flat, and while there were many differences between the details of each type, they were interchangeable.

Traffic

Before the Sino-Japanese war the income of the railways consisted mainly of passenger and goods revenues which accounted for approximately 95 per cent. of the total. Goods traffic was usually the more important item except on the Nanking–Shanghai, Shanghai–Hangchow–Ningpo and the Canton–Kowloon lines.

Passenger and Goods Revenues, 1936 (*thousands of dollars*)

Railway	Passenger Revenue	Goods Revenue	Total
Peiping–Hankow	8,579	21,599	30,178
Peiping–Liaoning	6,751	12,500	19,251
Tientsin–Pukow	8,995	12,300	21,325
Nanking–Shanghai	8,812	2,911	11,723
Shanghai–Hangchow–Ningpo ..	3,801	1,532	5,333
Peiping–Suiyuan	1,834	8,138	9,972
Chengtai	956	5,136	6,092
Taokow–Tsinghwa	261	1,560	1,821
Kaifêng–Honan	1,417	1,629	3,046
Lunghai	2,925	6,045	8,970
Tungkwan–Sian	923	761	1,684
Canton–Kowloon	1,670	186	1,856
Hupeh–Hunan	1,352	1,468	2,820
Tsingtao–Tsinan	3,363	9,893	13,256
Nanchang–Kiukiang	670	270	940
Canton–Hankow (southern section)	1,931	1,297	3,228
Total	54,249	87,262	141,495

Source: Woodhead, H. G. W. (editor), *China Year Book*, 1939, pp. 508–9 (Shanghai, 1939).

Most of the railway lines in China are situated in the eastern half of the country, either in rich fertile agricultural lands or mineral-producing districts. For this reason goods traffic generally plays a major part in the incomes of many of the lines, especially north of the Yangtze, where rivers are not very useful owing to seasonal variations in depths, and are also frozen over during the winter months.

In 1936 passenger revenue exceeded goods revenue for the Nanking–Shanghai, Shanghai–Hangchow–Ningpo, and the Canton–Kowloon railways, and also for the Nanking–Wuhu section of the Kiangnan Railway and the Soochow–Kashing loop-line. These are all situated along the great rivers or amidst a network of complicated canals. Though the area which the Nanking–Shanghai line traverses is densely populated and very productive, the railway runs parallel to the estuary of the Yangtze, which is one of the most navigable waterways in the world. Owing to the cheapness of river transport, with which the railways can hardly compete, most of the bulky goods are shipped by water instead of by rail, making the total goods revenue only about two-fifths of the passenger revenue in peace-time. Serving the Yangtze delta between the two provinces of Kiangsu and Chekiang,

the Shanghai–Hangchow–Ningpo railway passes through country very similar to that traversed by the Nanking–Shanghai line. Instead of the course of the Yangtze there are distinctive inland rivers and navigable canals, and in addition there is a prosperous coastal shipping between Shanghai and Ningpo. Thus a large part of the goods traffic is taken from the railways. In the case of the Canton–Kowloon railway the Si kiang takes a large proportion of the goods traffic which usually accounts for only one-fifth of the total revenue of the system.

Railways have contributed to the reduction of freight rates and have helped to relieve economic distress in the rural districts by facilitating the rapid transport of primary produce. Before the war preferential freight charges were granted for the transport of foodstuffs and other agricultural products on the various railways; cotton, flour, and peanuts transported by the Lunghai; wheat, flour, and dates by the Tsingtao–Tsinan; wheat, millet, barley, and cotton by the Peiping–Hankow. The Canton–Hankow railway adopted a special freight rate for Hunan rice transported to Kwangtung and Hupeh, and the Chekiang–Kiangsi railway for rice and grain.

Railways and mines were also mutually dependent, and coal constituted a major commodity in respect of tonnage and revenue. According to the freight classification in 1936 coal was assigned to the sixth class, the one bearing the lowest rate. Nearly all the railways charged certain special rates for coal transport either in the form of discounts from standard rates, or in the form of special rates for varying hauling distances or between particular points.

GEOGRAPHICAL DESCRIPTION

The following table lists the various railways which made up the railway system of China before the outbreak of the Sino-Japanese war in 1937:

RAILWAY	TERMINI
North of the Yangtze Kiang	
(1) Pinghan	Peiping–Hankow
(2) Tsinpu	Tientsin–Pukow
(3) Peining	Peiping–Mukden
(4) Pingsui	Peiping–Paotow
(5) Chengtai	Shihkiachwang–Taiyuan
(6) Tungpu	Tatung–Puchow
(7) Lunghai	Lienyunchiang–Paoki
(8) Kiaotsi	Tsingtao–Tsinan

Railway		Termini
South of the Yangtze Kiang		
(9)	Yuehhan	Canton–Hankow
(10)	Huning	Nanking–Shanghai
(11)	Huhanjung	Shanghai–Ningpo
(12)	Hankiang	Hangchow–Pinghsiang
(13)	Nanshan	Nanchang–Kiukiang
(14)	Hwainan	Loho–Yukikow
(15)	Kiangnan	Nanking–Tawangtsun
(16)	Chaoshan	Swatow–Chaochow
(17)	Changhsia	Amoy–Changchow
(18)	Sunning	Pakkai–Towshan
(19)	Yunnan	Haiphong–Kunming
(20)	Kwangchiu	Canton–Kowloon

All these were single-track except for a few sections on the more important lines, notably on the Peiping–Mukden railway, and apart from the Chengtai and Yunnan lines, which were metre-gauge, and a few unimportant colliery lines, all were standard-gauge. The Yunnan and Canton–Kowloon railways were partly foreign-owned; the remainder were under the control of the Chinese government under the Ministry of Railways. It is difficult to assess the relative importance of these lines, but the north-south Peiping–Canton (including the Peiping–Hankow and Canton–Hankow railways) and Peiping–Shanghai systems (including the Nanking–Shanghai, Tientsin–Pukow, and part of the Peiping–Mukden railways), and the east-west Lunghai and Chekiang-Kiangsi railways systems were the most significant (Fig. 86).

(1) *Pinghan Railway* (*Peiping–Hankow*)

The Peiping–Hankow railway forms part of the great north-south system which links Canton with the great Yangtze port of Hankow and Peiping where it connects with the Peiping–Suiyuan line stretching westward to Mongolia. It was the first expression of China's serious interest in railway construction and the first conscious effort at Westernization. The promoter, the viceroy Chang Chih-tung, had to contend with serious opposition, but his final success marked the end of resistance to railway construction in China. The railway was originally financed with a loan of £4,500,000 from Franco-Belgian interests. It was opened to traffic in 1905 and redeemed and taken over by the Chinese government in 1909.

The line is 753 miles long and single-tracked, but the earthwork and bridges are wide enough to take a double track in the first 90 miles from Peiping and in the last 20 before Hankow. Many of the rails were made by the Hanyehping iron works and weigh

approximately 85 lb. per yard. The steepest gradient, 1 : 66, is encountered from Hankow north to Wushengkwan pass. In 1936 there were only two tunnels, but some 970 bridges of spans over 2 metres, of which the most important was that over the Hwang ho, destroyed during the present war. This bridge had comparatively small spans carried on screw piles, and was of generally light construction since its parts were carried to the site in junks ahead of plate-laying so that the latter might not be delayed. It was intended as a temporary structure to be replaced later by a more permanent bridge, but was never built. Consequently the piles were not carried down to such a depth as to secure complete immobility in flood-time and had constantly to be patched with rubble to prevent the bridge being carried away. It was a source of anxiety and entailed a permanent speed restriction, and its destruction, therefore, is of no great consequence (Plate 120). In 1935 the rolling stock, much of which originated from the Tientsin–Pukow railway, comprised 205 locomotives, 300 carriages, and 2,705 wagons. The scheduled time of the 'Special Express' between Hankow and Peiping was 34 hours for the 753 miles.

The railway running north from Hankow for the first 60 or 70 miles traverses a well-watered region of great fertility, then the character of the landscape changes, the plain giving way to picturesque hills and undulating valleys. Embankments and cuttings carry the line ever upwards until it reaches the mouth of the tunnel, the earliest to be constructed in China, that pierces the Hwaiyang shan, dividing the Yangtze valley from the basin of the Hwang ho. At Sinyang the plain is again reached, and for miles the railway crosses an orchard country, the beginning of the great plain stretching away to the north and north-east beyond Peiping towards the Great Wall. Near the south bank of the Hwang ho it enters the loess country and a series of loess hills rise with ingeniously contrived cave dwellings at varying altitudes in the hillsides. North of the Hwang ho the line is never very far from the western mountains, which are nearly always in sight.

The railway, serving a thickly populated area of splendid possibilities, is of immense commercial and strategic importance which will increase with the development of the coal reserves of Honan and Shansi. To the north the large population of Peiping must be supplied with the necessities of life from the plains of south-west, while to the south there is the great urban complex of Wuhan.

The most important branch line runs from Taokow to Tsinghwa.

Formerly known as the Pekin Syndicate Railway, it was constructed with British capital, and was opened to traffic in 1905. It is standard-gauge, 96 miles long, and crosses the Peiping–Hankow railway at Sinsiang. It is primarily a mineral line, and is used for the transport of coal from the Syndicate's collieries in the Tsinghwa coalfield.

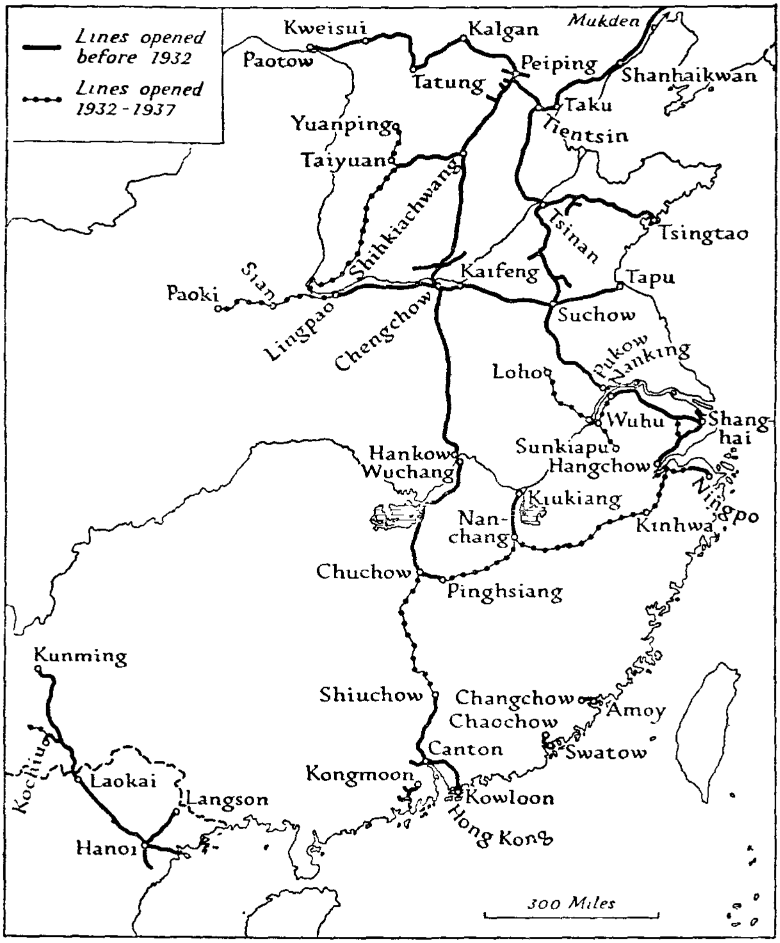

Fig. 86. Railways, 1932–37

(2) *Tsinpu Railway* (*Tientsin–Pukow*)

This line, which runs from Tientsin to Pukow, on the Yangtze, is of peculiar significance since it connects the North China Plain and the lower Yangtze valley, both fertile and densely populated,

and affords direct rail communication between Peiping and Nanking. In 1897 the Chinese sought financial help from the British, who planned to locate the southern terminus at Kwachow, almost opposite Chinkiang. This was opposed by the Germans on the ground that the new railway could adversely affect the Tsingtao–Tsinan line. In 1899 a provisional agreement was signed by which the concession was shared by Great Britain and Germany, and in the final agreement (1898) a new alinement was secured, and the southern terminus altered to Pukow. The northern section from Tientsin to the Kiangsu border was constructed by Germany; thence to the Yangtze by Great Britain, and the whole was finally opened to through traffic in 1912. According to the conditions of the agreement the line was handed over to the Chinese government.

The line is 628 miles long, standard-gauge and single-track except near the Yangtze terminus, where it is double. The rail used in the northern section is flat-bottomed in lengths of 10 metres, weighing between 76 and 90 lb. per metre; in the southern section an 85-lb. rail of British standard section in lengths of 30 ft. has been used. In the north, the sharpest curve is one of 1,968 ft. radius, and the steepest grade is 1 : 150; in the south there are no curves of less than 2,000 ft. radius, while the ruling gradient is 1 : 150 south of Pengpu and 1 : 200 north of it. There are no tunnels, but the country traversed by the line has called for a large amount of bridging, particularly in the northern section. The largest bridge is that over the Hwang ho, and there are also important ones over the Hwai ho and the Grand Canal just south of Hanchwang.

In 1934 the rolling stock consisted of 149 locomotives, 285 passenger coaches, and 1,879 goods wagons. Until 1933 there was no through connexion at Pukow with the railways of the Shanghai area; freight and passengers were transferred by lighter or ferry boat across the Yangtze to Nanking. In that year a more direct connexion was established, when a train ferry between Pukow and Nanking was put into operation (Plate 121). The main workshops are located at the Pukow terminus, at Tsinan, and at Suchow.

From Pukow the line runs in a north-westerly direction through level and well cultivated country, and crosses from Kiangsu into Anhwei, south of Wuyi. It then enters a range of low hills which form the watershed between the Yangtze and the Hwai rivers. There is a steady rise to a maximum of 344 ft. just north of Changpalin, followed by a gradual descent to the Hwai which is crossed near Pengpu. The railway now traverses a well cultivated and very fertile

plain, which is famous for its water melons, but also produces kaoliang, millet, peanuts, wheat, and cotton. The line then turns in a northerly direction, and after crossing the Lunghai Railway at the important junction of Suchow, passes through rocky and fairly wooded territory. Below Hanchwang it crosses the Grand Canal and then proceeds through flat country to Yenchow. It then seeks the higher ground along the foot of the Shantung uplands and rises steadily to Taian, near the sacred mountain of Tai shan. The rise is continued as far as Chiehshow, after which there is a drop down to the Hwang ho, which is bridged near Tsinan (Plate 122). North of Tehchow the alinement runs parallel to the Grand Canal for about 110 miles and then turns in an easterly direction to Tientsin.

The most important branch line is the colliery line, which leads to Tsaochwang and thence to Taierhchwang on the Grand Canal.

(3) *Peining Railway* (*Peiping–Liaoning*)

The Peiping–Liaoning or Peiping–Mukden railway runs 290 miles from Peiping through Tientsin to Shanhaikwan; there it enters Manchuria and continues on to Mukden. It is the oldest among existing Chinese railways, being an extension of the Tangshan–Hsukochwang railway (completed 1881) which was constructed for coal transport for the Kailan Mining Administration (see p. 565). The line was financed with Chinese and British capital (British and Chinese Corporation) and was completed to Mukden by 1907.

The gauge is standard, and prior to 1937 some 93 miles (Chinwangtao–Tangshan: Tientsin–Taku) were double-tracked; the maximum gradient is 1 : 100. The railway lies mainly over the plain, and the bridging of small and large rivers has provided the chief work. The largest bridge, over the Taling ho, is 2,862 ft. long and consists of 27 spans of 106 ft. each. Some of the river beds have steep gradients; throughout the greater part of the year they are almost dry, but become torrents in the rainy season.

From Fengtai, where connexion is made with the Peiping–Hankow line, the railway runs in a south-easterly direction across level plains to Tientsin and Taku. There it turns north-east across a region famous for its salt manufacture. Many saltfields, with their windmills, help to relieve the monotony of a dreary landscape. At Tangshan and Kaiping there are important coalfields under the common management of the Kailan Mining Administration. Bearing in an easterly direction across wide plains relieved by low hills, the line passes through Lanchow, another coal-mining centre,

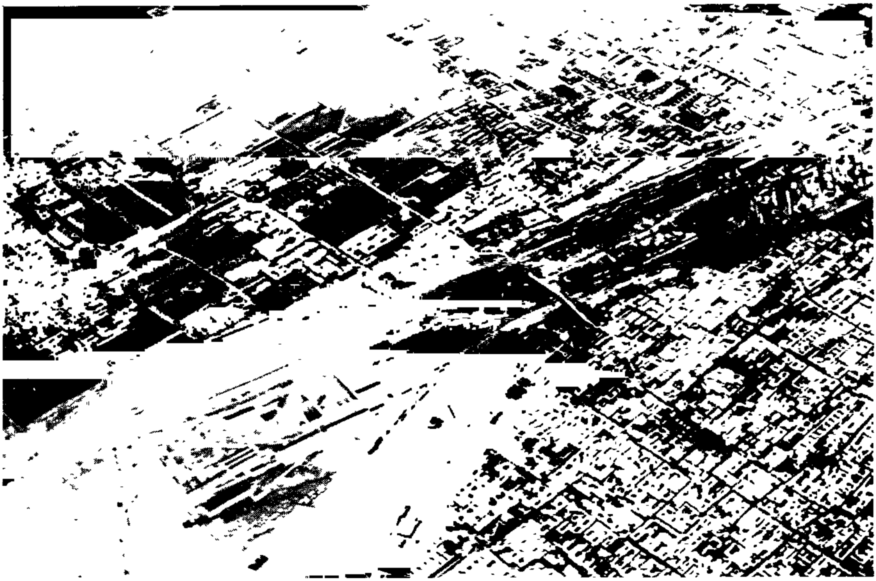

Plate 125. Shihkiachwang, Shansi

An aerial view of the town and railway yards of Shihkiachwang, junction of the Peiping-Hankow, Chengtai, and Tehshih railways.

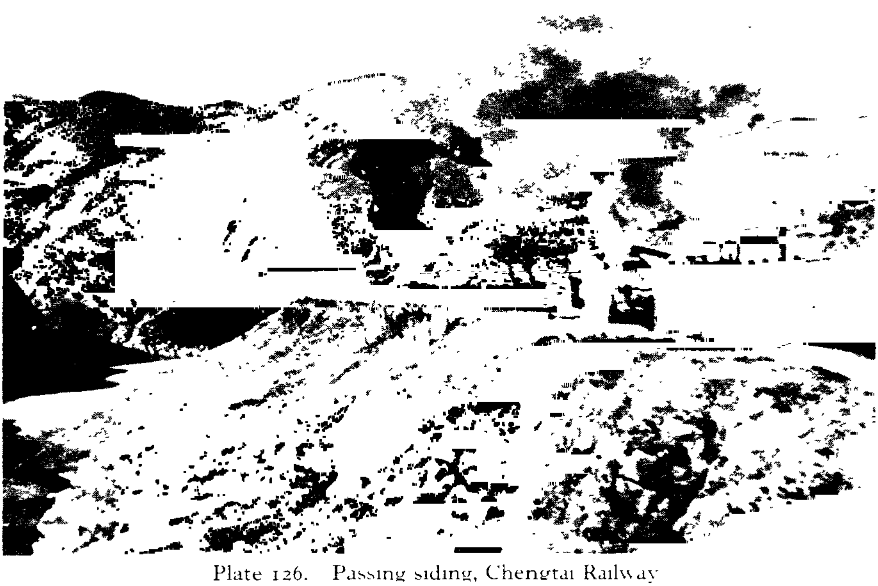

Plate 126. Passing siding, Chengtai Railway

One of two passing sidings on the Chengtai Railway in the mountainous country of eastern Shansi.

Plate 127. Station, Tungpu Railway
The station at Pingyao, central Shansi, of the metre-gauge line from Tatung to Puchow.

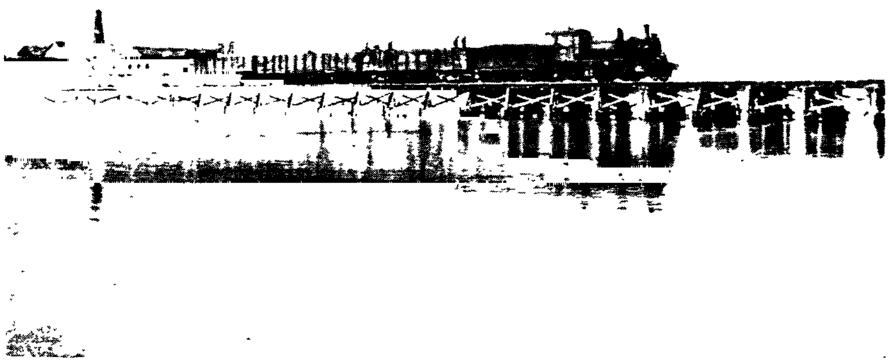

Plate 128. Railway bridge near Sienyang, Shensi
A temporary bridge over the Wei ho near the junction of Sienyang

and reaches Changli. It then approaches the coast of the Gulf of Pohai and runs through beautiful country with hills on one side and the sea on the other. The coastal plain narrows considerably as the line nears Shanhaikwan at the eastern end of the Great Wall.

In war-time this important railway has a vital strategic significance since it is the main link between the old capital at Peiping and the important city of Mukden. In peace-time it provides an outlet for the agricultural and mineral resources of Manchuria, and affords quick transport between China Proper and the north-eastern provinces.

At Chinwangtao there is an important short branch line, primarily for conveying coal from the Kaiping mines to the ice-free port of Chinwangtao.

(4) *Pingsui Railway* (*Peiping–Paotow*)

By virtue of its Nankow pass hill section and of its being the earliest line financed, constructed, and operated by the Chinese, this system, generally known as the Peiping–Suiyuan railway, is noteworthy among Chinese railways. The cost of its construction was met out of the surplus profits of the Peiping-Liaoning railway, and it was intended that it should be the first section of a future through-route to the far north-west of China and Outer Mongolia. Construction was begun from Fengtai, a suburb of Peiping, in October 1905, and the first 35 miles to Nankow were opened in the following year. By September 1909 Kalgan was reached, and after delays due to the revolution, plate-laying was continued north of Fengchen by 1915. It was completed to Kweisui in 1921, and to Paotow in 1923, the terminus being 816 miles from Fengtai.

The main line, which is standard-gauge and single-track throughout, traverses difficult mountain country and abounds in steep gradients, sharp curves, and numerous tunnels ; at Nankow pass the line breaks through the Great Wall (Plate 124). From 239 ft. above sea-level at Fengtai (Peiping) it rises to 5,304 ft. at Shihpati, and then descends to Kweisui and Paotow, which are both about 3,500 ft. above sea-level. Generally speaking, the main line and principal running loops are laid with 85 lb. rails and branch lines and other loops and sidings with 60 lb. material. The rail-length is in nearly every case 30 ft. ; untreated wooden sleepers are used throughout.

In the initial 35 miles to Nankow the railway gradient is 1 : 100, and the sharpest curve 1,000 ft. radius, but in the next 12·2 miles the line rises through 1,644 vertical feet with a 1 : 30 ruling grade

uncompensated for curvature, which is equivalent to about 1 : 27 on the straight; it then falls 206 ft. in the succeeding 6·3 miles to Kangchwang with no steeper gradient than 1 : 118. The 18·5 miles from Nankow to Kangchwang are known as the Nankow pass hill section, and in it there are 51 curves totalling 6·51 miles in length. At Chinglungchiao a reversing station was found to be necessary in order to attain the required height of 1,959 ft. at the summit a mile beyond. There are four tunnels in the Nankow pass section, 3,580 ft. (at the summit), 1,204 ft., 463 ft., and 156 ft.

The working of the railway is limited entirely by the capacity of the Nankow pass section, where speeds must not exceed 10 m.p.h. Trains from Peiping are usually divided into two or more parts, and each part is pushed in the rear by a powerful Mallet compound locomotive (2–8–8–2 type) as far as the reversing station at Chinglungchiao. Thence each portion is hauled over the summit to Kangchwang and again united to its counterpart at that point.

The rolling stock consists of 138 locomotives mainly of the Mallet compound type, and 1,586 coaches and wagons. All plant put into use on this line since 1935 has been supplied by the Japanese. The principal railway workshops are at Nankow and there are smaller ones at Kalgan. Owing to the poor quality of the sleepers only low speeds varying from 10 to 25 m.p.h. are permitted, but where re-sleepering, extra-ballasting, and re-alining have been carried out 30 m.p.h. speeds are allowed.

Economically and politically this line has a considerable importance. It has opened up the country to the north-west of Peiping and greatly cheapened as well as expedited the transit of goods from the interior to Tientsin. Kalgan is at the junction of the great caravan routes from the west and the north, by way of which come the bulk of the wool and skins from Mongolia and Kansu, which form the most valuable of the export cargoes from Tientsin.

There is a short 16-mile colliery branch line, which runs from Hsichihmen (Peiping) to Mentoukou.

(5) *Chengtai Railway* (*Shihkiachwang–Taiyuan*)

This line runs some 151 miles in an east-west direction from Shihkiachwang, a junction on the Peiping–Hankow railway (Plate 125), to Taiyuan, the capital of Shansi. It was constructed between 1904 and 1907 partly with French capital and partly with a government loan. In accordance with the loan agreement the line was after thirty years formally handed over to the Chinese government in December 1932.

The engineering work proved very difficult, and owing to the mountainous nature of the country a metre-gauge with 60 lb. rail instead of the standard-gauge was adopted. The line was reconstructed on a 4 ft. $8\frac{1}{2}$ in. gauge by the Japanese in 1939. There are no double-tracked sections. The rise is practically from sea-level to a maximum of 3,500 ft. between Chingtsun and Shouyang. Of the many bridges constructed the most important is at Niangtzekwan. In 1934 the rolling stock comprised 68 locomotives, 82 passenger coaches, and 766 goods wagons.

In running west from Shihkiachwang the line enters the hills at Toutsun. There is a fine viaduct leading to the first tunnel some 3 miles from the latter place. After entering the hill country and passing through Yangchuan, a coal and iron mining centre of some importance, the track follows the valley—often a gorge with precipitous sides—of a tributary of the Huto ho, one of the main rivers which flow eastwards across the plains of Hopeh to enter the Hai ho system. From Shouyang, the highest point, the line follows a tributary of the Fên ho, until at Yutze it turns northwards across high level ground to Taiyuan. The most prominent landmark near Taiyuan is the Shuang Ta' Miao (Double Pagoda Temple), situated about 2 miles south-east of the city on the bordering loess hills.

Both the rivers referred to above have cut their way through the loess well into the underlying rock and—due to variations in hardness and dip of strata—they twist and turn to such an extent that the train in following the banks is directed to almost every point of the compass. Only a very small proportion of the track is straight. Tunnels, principally through limestone strata in the precipitous sides of the hills bordering on the streams, are numerous, and there are two passing sidings (Plate 126).

This railway is potentially of great significance. Not only does it provide access to some of the important mineral areas of Shansi, but it is likely to become part of a trunk system linking Taiyuan with the Shantung port of Tsingtao.

(6) *Tungpu Railway* (*Tatung–Puchow*)

This line crosses the province of Shansi from Tatung in the north to Taiyuan and thence down the valley of the Fên ho to Puchow, just opposite Tungkwan on the Lunghai Railway in the south. Many unsuccessful attempts were made towards its construction, and it was not until 1932 that General Yen Hsi-shan mobilized his engineer corps and started the earthwork for a metre-gauge railway.

From Taiyuan, where it connects with the Chengtai system, it was pushed in two directions, north and south, and by 1936, except for the section between Yuanping and Tatung, the line was completed. To facilitate direct communications a bridge across the Hwang ho to connect Tungkwan with Puchow was under consideration by the Ministry of Railways. According to recent reports the whole of the line has been converted to standard-gauge by the Japanese.

(7) *Lunghai Railway* (*Lienyunchiang–Paoki*)

This is one of the main trunk lines of the Chinese railway system and runs over 680 miles, from Lienyunchiang (Laoyao) on Haichow bay to Paoki, a town on the border of Shensi and Kansu in the far interior. It has been constructed in sections—the first from Kaifêng to Loyang was completed and opened to traffic in 1909. Other sections were completed by small Chinese companies, but all were amalgamated into a larger scheme in 1912, when a loan was obtained from a Belgian syndicate (*Compagnie Générale de Chemins de Fer et Tramways en Chine*). After the war of 1914–18 the line was gradually extended. In the west it was opened to Tungkwan in 1932, to Sian in 1934, and to Paoki in 1937; in the east it was extended to Lienyunchiang in 1933.

The line is standard-gauge and there are no double-tracked sections. The maximum gradient between Lingpao and Haichow is 1 : 66, and between Lingpao and Tungkwan 1 : 100. The maximum curve radius is 500 metres and the minimum 250 metres. There are many bridges, of which the two principal ones are located at Kunghsien, over the Yi ho, and at Sienyang. In 1936 the equipment, which was in good condition, consisted of 86 locomotives, 36 passenger coaches, 44 covered wagons, 774 open trucks, 97 Belgian freight cars and 27 all-steel passenger coaches, among other installations which were provided by the General Electric Company and the Fraser and Chalmers Engineering Works.

The Lunghai Railway runs in a westerly direction from the port of Laoyao through low-lying country through Tapu, for long the eastern terminus, to Haichow and Yaowan, where it crosses the Grand Canal. After reaching Suchow, the junction on the Tientsin–Pukow railway, there is a gradual rise as the line passes into the province of Honan. At Shangchiu the line follows a north-westerly direction until it reaches Kaocheng and then resumes its westerly course to Kaifêng. The alinement then keeps close to the Hwang ho and at Chengchow crosses the Peiping–Hankow railway. Hills now

approach close to the railway and near Tungkwan the mountains are always in sight. To the west of Tungkwan the line follows the Wei ho, for centuries the trade route from Kansu and Szechwan, to the ancient capital of Sian, and eventually reaches Paoki (Plate 128).

The railway traverses a fertile, well-populated country, and has helped to develop one of the most wealthy regions of China. Its importance has been greatly enhanced by the fact that over considerable stretches it runs parallel to those sections of the Hwang ho which steamboats are unable to navigate. In the future the Chinese government plans to extend it first to Lanchow and thence northwestwards across Central Asia to link up with the U.S.S.R. railway system.

(8) *Kiaotsi Railway* (*Tsingtao–Tsinan*)

By the convention relating to the lease of Kiaochow, signed in March 1898, China gave to Germany among other privileges the right to construct a railway from Tsingtao (Kiaochow) to Tsinan in the north-western portion of the province of Shantung. It was completed in April 1904, and operated by a German company until the outbreak of the war of 1914–18, when it came under Japanese control. As a result of the Washington Conference and an agreement with Japan signed in January 1923, the line was redeemed by the Chinese government.

The railway is 256 miles long, standard-gauge and single-track. The route taken was singularly free from engineering difficulties, cuttings being required in few cases only, while tunnels were nowhere necessary. There are no heavy gradients, and the maximum curves are of 5 degrees. The chief difficulty arose in connexion with the bridging of the numerous watercourses which vary considerably in volume at the different seasons of the year. Most important among the bridges are those over the Litsun, Peisha, Chengyang, Taku, Wei, Yun, Mi, and Tze rivers.

From the port and naval base of Tsingtao the railway runs in a northerly direction across marshy land with Kiaochow wan on the left and undulating hills on the right. Away to the east can be seen the peaks of Lao shan. Bearing west the line passes through Kiaochow and then crosses a wide, densely populated plain to Kaomi and Weihsien. The latter is an important route centre and is linked by the north coast route to Weihaiwei and Chefoo. Between Weihsien and the trading centre of Choutsun the railway passes through extensive plains studded with prosperous villages and

hamlets, each surrounded by woods of tall trees. In summer the plains are covered with green kaoliang plantations ; millet, wheat, beans, fruit, and vegetables are also grown. At Changtien there is an important branch to the Poshan coalfields. West of Chowtsun the railway runs along the edge of the western upland of Shantung to connect up with the Tientsin–Pukow railway at Tsinan.

This system has great economic and strategic importance. The main line traverses a country the resources of which are still relatively undeveloped ; its terminus is a port endowed by nature with excellent harbour accommodation, and in the winter months Tsingtao is the natural outlet for the trade of North China.

(9) *Yuehhan Railway* (*Canton–Hankow*)

The original concession for the construction of a 700-mile railway between Canton and Hankow was first conceded to the American China Development Co. in April 1898. Disagreement of a serious nature between the contracting parties arose not long after the conclusion of the contract, and in 1905 the railway was redeemed by the Chinese government. Eventually new capital was obtained from an international syndicate known as the Hukuang Railway Loans. By 1915 the railway had been built from Canton to Shiuchow in the south, while two years later it was completed between Wuchang and Changsha in the north. This section was later extended to Chuchow to facilitate the transport of coal.

Owing to lack of funds and great engineering difficulties in the mountainous country of southern Hunan construction was then suspended, and the middle section from Chuchow to Shiuchow, a distance of about 240 miles, was left unfinished for nearly twenty years. In 1922, however, the British government decided to remit the balance of the Boxer Indemnity Fund, and strongly recommended that the proceeds should be used in part at least to complete this north-south line running through the heart of the country. The work was undertaken in 1933, and the final section between Chuchow and Shiuchow was opened in April 1936. Probably the most difficult part of the new construction was the piece between Lokcheung and Chenchow across the divide between Hunan and Kwangtung (Plate 129). Work was very heavy and necessitated many rock cuttings, much tunnelling, and the construction of high viaducts and extensive retaining walls. The original location of this section was carried out by British engineers and included some 66 tunnels. Further survey enabled the alinement to be improved

and tunnels reduced to a total of only 16. The line is standard-gauge and single-tracked except at stations where loop-lines are provided. In the recently completed section 85 lb. rails in 40 ft. lengths have been used, and the sleepers are either of Australian hardwood, Douglas fir, or local Hunan pine. Prior to the war orders for rolling stock were being placed with foreign firms. The type of locomotive in use was the fine 4–8–4 manufactured by the Vulcan Foundry Co. The passenger coaches were being supplied by the Birmingham Railway Carriage and Iron Co., and were reported to be of excellent material and design.

Leaving Wongsha terminus (Canton), the line runs in a north-westerly direction through ricefields and crosses frequent water-courses until it reaches Kotong on the Liuhsi shui, a busy stream about 50 yards wide. The line then keeps to the fertile rice plains, but beyond Yuantanchu it runs through low hills and approaches the Pei kiang near Pakonghow. Following closely on the left bank, the line leaves the river only to cross pronounced bends. North of Yingtak the country is on the whole undulating or flat surrounded by low hills with high hills in the distance. At Machuchu the railway leaves the river to avoid a big bend and rejoins it at Shiuchow. It then follows the left bank of the Wu shui in a direction north-west through a mountainous and difficult terrain. At Pingshek it strikes due north, across the Hunan-Kwangtung border, passes over the divide between the Yangtze kiang and Si kiang basins, and follows the Lui ho valley until it reaches the main valley of the Siang kiang. Beyond Hengyang to Chuchow the line traverses rolling country, and there is only one short tunnel and one retaining wall. There are, however, three major bridges over the Lei ho, Ni ho, and Lo ho, all tributaries of the Siang, and parts of the line are liable to floods. From Chuchow the line veers north-west to Changsha and then north to north-east to Yochow and Puchi, on the shores of Tungting hu, then enters Hupeh, and proceeds through low-lying, well-watered country to Wuchang.

The country traversed by the line is well populated, fertile, of reputed mineral wealth, and there are important concentrations of cities near the northern and southern terminus. In 1936 the prospects for traffic were excellent. The railway provides the natural outlet for the cereals, wood-oil, antimony, and coal of Hunan, which will be transported southwards to Canton and Hong Kong. Conversely the transport of such manufactured products as sugar, salt, silk, cotton goods, and sea products to the interior will be facilitated.

Passengers too can be carried from Hankow to Canton in 36 hours instead of 10 to 15 days via Shanghai. It has, moreover, brought Peiping and Canton within 3 days of one another and has inaugurated a new era in the intercourse of the Chinese people between the North and the South.

Details of the chief branch lines are as follows :

(*a*) *Pinghsiang–Chuchow*. This line connects the coal mines near Pinghsiang with Chuchow. It is 60 miles long, of standard-gauge, and is now linked up with the Chekiang–Kiangsi railway.

(*b*) *Canton–Samshui*. This standard-gauge line, the Kwangsan Railway, was built by the American China Development Company under the original Canton–Hankow concession, and was open to traffic in 1903. It runs from Shekwaitong, opposite Canton, on the right bank of the river to Fatshan and Samshui, a distance of $30\frac{1}{2}$ miles. The track is double from Canton to Fatshan and single the rest of the way.

(*c*) *Canton–Whampoa*. To speed up port development at Whampoa, the Chinese government decided to build a branch line connecting the Sichuen station of the Canton–Hankow railway with Whampoa, over a distance of 26 miles. Construction started in November 1936 and was completed in December 1937. It skirts the northern suburbs of Canton, passes through the industrial district of Tungshan, and links up with the Canton–Kowloon railway.

(10) *Huning Railway* (*Nanking–Shanghai*)

This line links Nanking, the national capital of China, with Shanghai, the commercial metropolis of the Far East. It was financed with Chinese and British capital under a final agreement in 1903, and was opened to traffic in 1908.

The main line is 193 miles long of standard-gauge, and there are double-tracked sections between Shanghai and Nanhsiang, and according to some reports between Nanhsiang and Soochow. Quite a feature from the engineering point of view is the number of bridges and culverts which were rendered necessary by the numerous waterways. There are no fewer than 303 bridges and 405 culverts on the whole line. The ruling gradient is 1 : 200, of which, however, there are only 5·64 miles, and as many as 128 miles are easier than 1 : 1,000. The sharpest curves are of 3 degrees, but there are only two of these, totalling 4,180 ft. in length, out of a total of 59.

The line runs due west from Shanghai across low-lying, highly cultivated country which is characteristic of the Yangtze delta. The

land is intersected with numerous canals and creeks, and in no other part of China perhaps is it possible to obtain a better conception of the agricultural resources of the country. At Soochow, some 60 miles from Shanghai, the railway has access to the Grand Canal, and a fair goods traffic is handled. Wusih, the silk centre, is another important station on the line, and the surrounding country is one large mulberry plantation. Beyond Wusih the contour changes and the line traverses an undulating and rising terrain, then descends on easy gradients through heavy cuttings and a tunnel through the Fort hill near Chinkiang (Plate 131). The alinement then follows the foot of the hills via Lungtan to Nanking, avoiding the outer country, which is subject to periodical inundation. The scenery along this section is perhaps the most interesting on the railway; on one side are hills and on the other are picturesque ricefields, with here and there a lonely farm.

This system has not played a major part in the economic development of Shanghai, which owes much more to water transport. The minor importance of railways to Shanghai is shown by the fact that the two lines tributary to the port, the Nanking–Shanghai and the Shanghai–Hangchow–Ningpo, together carried only 2,370,000 tons of freight in 1930. In 1931 and 1932 their tonnage was less and averaged only 7·5 per cent. of the total tonnage carried by all the railways of China Proper.

One important branch line is from Shanghai to Woosung. This is 10 miles long, standard-gauge, and connects Shanghai North station with Woosung, the port for ocean-going steamers. It was China's first railway, being constructed in 1876, dismantled in 1877, and rebuilt in 1898 with the aid of Chinese capital.

(11) *Huhanjung Railway* (*Shanghai–Hangchow–Ningpo*)

Originally the concession for this railway was given to the British and Chinese Corporation, Ltd., in 1898, but owing to failure to begin construction within six months the agreement was cancelled by the Chinese government and the concession transferred to two Chinese companies, which started work in 1906. This contravened the terms of the contract and after some discussion the government agreed in 1908 to accept a loan of £1,500,000 from the original concessionaire. The section from Shanghai to Hangchow was opened in 1909, but the line immediately east of Hangchow was delayed owing to the difficulty of bridging the Tsientang kiang. In 1934 the Ministry of Railways secured a loan from the British and Chinese Corporation,

Ltd., and the Chinese Development Finance Corporation for completing the line from Hangchow to Ningpo and for building a bridge across the Tsientang kiang. This work was completed by 1937.

The length of the line is 174 miles, of which the greater part is in Chekiang and the remainder in Kiangsu. It is single-track and of standard-gauge; 75 lb. to 80 lb. rails, in lengths of 9 metres, have been in general use. The territory traversed is low-lying, and the ruling gradient used in approaches to bridges is 1 : 300, and the sharpest curve is one of 1,320 ft. radius. Bridges and culverts are numerous, and a remarkable achievement is the building of the Tsientang bridge near Hangchow. It consists of 16 main through type truss spans of 220 ft., carrying a 20-ft. roadway, and two 5′ 6″ footways on the top, and a single line railway on the bottom boom, and has steel arch roadway approaches vertically over the railway embankments; the steelwork in the main spans was supplied by Dorman, Long and Co., Ltd. (Plate 132).

Following a south-westerly course from Shanghai the railway crosses fertile plains, well cultivated but much intersected by waterways. It passes through Kashing, an important junction with a branch railway to Soochow, and thence onward in a southerly direction away from the Grand Canal, thus avoiding the competition of waterborne traffic. It reaches the north-eastern corner of Hangchow, follows the east wall of the city and ends at Zakow (Plate 151). South of the Tsientang kiang it proceeds in a west-east direction through the famous wine centre of Shaohing to the terminus at Ningpo.

The Soochow–Kashing loop connects Soochow on the Nanking–Shanghai line to Kashing, and was completed in April 1936. It measures 45 miles, and was constructed primarily for the purpose of shortening the distance between Nanking and Hangchow, the mileage being reduced by 69 miles. The new railway should serve as an important feeder since the Tai hu district through which it travels is densely populated and rich in agricultural resources, but was reported dismantled by the Japanese.

(12) *Hankiang Railway* (*Hangchow–Nanchang–Pinghsiang*)

This railway, usually known as the Chekiang–Kiangsi railway, may be divided into three sections. The first from Hsiaoshan, opposite Hangchow, to Yushan on the border of Chekiang and Kiangsi, was completed in December 1933, and was financed ex-

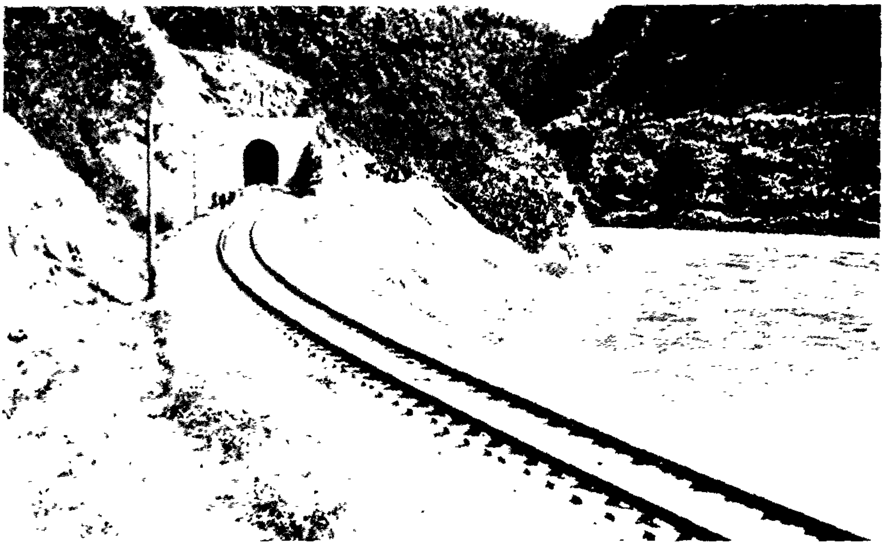

Plate 129. Tunnel, Canton-Hankow railway
A tunnel in the difficult section of the line on the Kwangtung-Hunan border.

Plate 130. Shiuchow, Kwangtung
The railway bridge of the Canton-Hankow railway across the Pei Kiang at Shiuchow in course of construction.

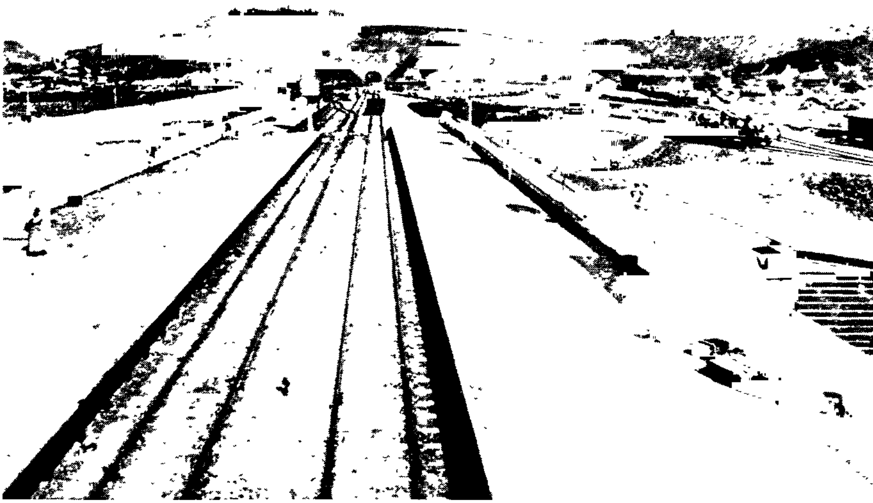

Plate 131. Chinkiang railway station
A view of the Shanghai–Nanking railway at Chinkiang with the station and the tunnel through Fort hill.

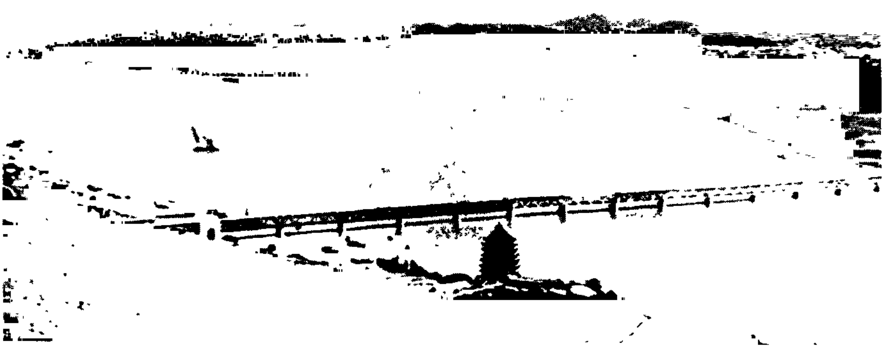

Plate 132. Tsientang bridge near Hangchow
The bridge just after its completion in 1937; it was destroyed by the Chinese on the outbreak of the Sino-Japanese war.

clusively by the provincial government. The Yushan–Nanchang section was opened to traffic in January 1936, and has been administered jointly by the Ministry of Railways and the Chekiang and Kiangsi provincial governments. Materials, as well as locomotives and coaches, were furnished by the German firm of Otto Wolff. With the aid of a further loan from Germany, the Chinese at the outbreak of the Sino-Japanese conflict were constructing the final section of the line from Nanchang across western Kiangsi to Pinghsiang, thus linking up with the Canton–Hankow network. Owing to its great strategic value this part of the line was rushed to completion and opened to traffic shortly after the outbreak of war.

The railway is 680 miles long and single-track. The standard-gauge is used and the rails weigh 31·16 kg. per metre in the section west of Yushan. As the Hangchow–Yushan section uses a lighter rail of 35 lb. per yard, steps were being taken in 1936 to replace the lighter rails by heavier ones of 65 lb. Between Hangchow and Yushan the sharpest curves are 200 metres radius, and between Yushan to Nanchang 300 metres. There are numerous bridges, for example, 85 in the Yushan–Nanchang section, including the important Chungcheng bridge. A suspension bridge carrying double tracks crosses the river for a length of 500 yards at a height of about 100 ft.

The rolling stock is of smaller size than is the case with the older established Chinese lines. In the summer of 1937 trains did the journey from Hsiaoshan to Nanchang in 22 hours. They went very slowly and gingerly over some of the river bridges, which did not appear to be very strongly built, and some of them were in fact temporarily broken by summer flood waters.

From Hsiaoshan the railway runs in a generally south-westerly direction along the valley of the Puyang kiang for about 60 miles, it then crosses a low divide into the valley of the Kinhwa kiang which it follows to Kinhwa. The areas traversed by this part of the line are among the richest and most populous in Chekiang. Near Kinhwa the railway bears away from the river and traverses rolling country, always in sight of the mountains but never reaching them. The lower hillsides are ideal for orchards and some of the finest varieties of fruit (peaches and plums) are grown. After passing through quite rugged country near Lanchi, the railway enters a region of fertile fields and frequent villages. Rising impressively to 3,000 ft. from the valley floor, the peak of the famous Peipan shan can be seen for a considerable time.

Beyond Lanchi the railway follows the course of the Ku ho through Chüchow and then crosses, by means of an exceptionally favourable location, the range of mountains which form the boundary between Chekiang and Kiangsi. It then continues to Yushan, and thence to Shangjao, Kweichi, Tungsiang, and Tsinhsien to Nanchang. The character of the country traversed is similar to that in the first section though there are three rather important streams crossing. From Nanchang the line follows a south-westerly course through the large coalfields of western Kiangsi, where it connects with the colliery town of Pinghsiang.

Because of its economic and strategic value this line is one of the most important railways in China south of the Yangtze. It is a connecting link which brings all the areas served by the Canton–Hankow system in direct touch by rail with Shanghai and other centres in the Yangtze delta. It affords a ready means for the transport of troops and supplies, and was used in this way in the campaign against the Communists in 1934 and against the Japanese in the present war.

(13) *Nanshan Railway* (*Nanchang–Kiukiang*)

This railway was constructed with Chinese capital between 1908 and 1915. It is standard-gauge and single-tracked and about 87 miles long. The sleepers are in a deplorable condition, but the rolling stock, though old, is serviceable. The Chungcheng road and rail bridge over the Kan kiang at Nanchang connects this system with the Chekiang–Kiangsi line. The bridge is 3,535 ft. long, 26 ft. wide, and has 18 spans, and is built of reinforced concrete. Other important bridges are located near Teian and Tukiafow.

From Kiukiang on the south bank of the Yangtze the line runs almost parallel with the west bank of Poyang hu. The country is rolling and fairly easy; hills can be seen to the west. About 10 miles from Nanchang the railway descends into the valley of the Kan and the gradient is rather stiff. The line has considerable commercial possibilities, and opens up one of the richest tea districts in the Yangtze, which was formerly dependent on water transport.

(14) *Hwainan Railway* (*Loho–Yukikow*)

The Hwainan railway starts from Loho (Tienchiaan), on the Hwai ho in northern Anhwei, and terminates at Yukikow on the north bank of the Yangtze, about 7 miles below Wuhu. It travels parallel to the section of the Tientsin–Pukow line between Pengpu

and Pukow and is 133 miles long; construction, financed by Chinese capital, started in 1932 and the line was formally opened to traffic in 1936.

Since the original purpose of the line was to facilitate the transport of coal from the Hwainan mines, located south of the Hwai river, medium-weight rails are used throughout its length. The gauge is 4 ft. 8½ in., and there are no double-tracked sections. The maximum gradient is 0·8 per cent. and the minimum curve radius about 325 metres. Bridges of more than one span are built of reinforced concrete, but single span bridges are of cut stone. Culverts are of corrugated iron on the Loho–Hofei sections and of concrete on the remainder of the line. At the beginning of the war, this line was reported to have 14 locomotives, 34 passenger coaches, and 64 goods wagons, mostly of 15-ton capacity.

Though the transport of coal from the mines in northern Anhwei is the primary object of the line and its traffic consists mainly of coal, it has also proved a boon to the population of the district it serves. In 1936 the system was able to show increasing passenger traffic as well as goods traffic.

(15) *Kiangnan Railway* (*Nanking–Tawangtsun*)

This line, running from Nanking to Wuhu and thence to Tawangtsun, just south of Suancheng in southern Anhwei, was constructed by a private concern, the Kiangnan Railway Company. Originally it was intended to extend the line to Chekiang and Fukien, but this fell through owing to lack of funds. In 1936, however, the Ministry of Railways took over the construction of the extension southwards to Sunkiapu and Tawangtsun and planned to link it up with the Chekiang–Kiangsi railway at Chüchow in Chekiang.

The line is standard-gauge and approximately 110 miles long. Bridges are chiefly of a temporary nature built a short distance away from the line on diversions and made of untreated timber. Between Nanking and Wuhu the railway is low and depends on dykes for protection against flooding. The line is expected to deflect from water routes a certain amount of traffic hitherto using the Yangtze kiang.

(16) *Chaoshan Railway* (*Swatow–Chaochow*)

This short line (27 miles) which runs through easy country is standard-gauge and was opened to traffic in 1906. The capital was subscribed entirely by Chinese, and its object was to bring Chaochow,

a prosperous city and chief centre of trade for the eastern Kwangtung and western Fukien, into direct contact with the sea. Owing to the keen competition of cheap steamer services the earnings of the railway have been very small and insufficient to pay any dividend. It is reported that the line has been destroyed by the Chinese, and that the bed is now used as a motor road.

(17) *Changhsia Railway* (*Amoy–Changchow*)

The funds for this line were obtained from Chinese sources and the work was carried out by Japanese engineers. It was originally intended to construct the line to Changchow, but it was never built beyond Kiangtungchow (18 miles). The gauge is 4 ft. 8½ in., and the principal bridges are over the Hukongkhe and Haitsang rivers. Since 1918 services have been practically suspended on account of loss of business and military interference.

(18) *Sunning Railway* (*Pakkai–Towshan*)

This line was constructed by the Sunning Railway Company and opened to traffic in 1909. Much of the capital was subscribed by the Chinese in the United States and Hong Kong. It was the first private railway to be financed, constructed, and operated entirely by Chinese.

From Towshan, near the port of Sanchiahai, the line runs north-west to Sunning, thence to Kungyifow, on Sencheung creek, a large navigable waterway, ¼ mile wide at the ferry station. The line then turns east to Kongmoon on the Si kiang and thence to Pakkai, 67 miles in all. It is single-track and standard-gauge. The Sunning-Yeungkong branch is only constructed as far as Paksha.

(19) *Yunnan Railway* (*Haiphong–Kunming*)

This line forms the northern portion of the system of railways running between Haiphong and Kunming. The section in Chinese territory (288 miles) begins at Kunming and ends at Hokow on the Chinese side of the Red river opposite Laokai, whilst the rest of the line (247 miles) traverses French Indo-China, veering south-eastward to Hanoi and Haiphong.

In 1897 the Chinese authorities granted the French government the right to build a railway from Haiphong and Hanoi across the Indo-China frontier at Laokai towards Kunming. The project drawn up in 1903 laid down that the line was to pass through or

near Mengtsz, where there were tin deposits. At first it was proposed to follow the Red river to Manhao, then its tributary the Sinchien, reaching Kunming via Mengtsz, Lingan, and Sinning, but the very bad climatic and topographical conditions led to the abandonment of this alinement. The course ultimately selected and accepted by all parties in 1904 follows the Namti valley to Chechuan and proceeds thence by way of the valleys of the Pata ho (Si kiang basin) and the Tachen kiang (Yangtze basin). Even then the work was extremely difficult, and between 1903–36 fleets of junks were needed to carry the material up the Red river from Hanoi to Laokai until the line reached the latter place. The work was directed from Mengtsz, also at first served by junk and mule transport. Surveying and demarcation continued until 1905, and construction was begun in the following year.

The railway passes through extremely rugged country and is considered to be an engineering achievement. One of the greatest difficulties was lack of an adequate supply of labour and large numbers of coolies had to be brought in from other provinces of China and the adjacent parts of French Indo-China. Nearly 45,000 Chinese labourers from Kwangsi, Kwangtung, Tientsin, Foochow, and Ningpo took part in the construction work under conditions of unbelievable hardship. During the first year of construction, 70 per cent. of the labourers on the southern section died. Later on sanitary conditions improved and the mortality rate declined, but even in regions not infested with malaria the conditions of work were exceptionally severe. Political difficulties were also encountered and it was not until 1909 that this part of the line was completed. The first locomotives reached Kunming in January 1910, and the whole line was opened to traffic on April 1 of that year. The 1903 agreement stipulated that the line should pass to China after a period of eighty years, against compensation for such invested monies as remains uncovered by repayments from receipts. A new agreement was approved and ratified in 1936 for the revision of the 1903 contract.

The Yunnan Railway is metre-gauge and single-tracked throughout; the rails are flat-bottomed and weigh 60 lb. per yard. Within China there are 3,628 engineering works, including 107 viaducts and bridges over 66 ft. long, and 172 tunnels totalling $12\frac{1}{2}$ miles in length. The railway climbs from sea-level at Haiphong to a height of 6,644 ft. on the Yunnan plateau (Fig. 87). The steepest gradient is 1 : 40, and the sharpest curve 328 ft. radius.

In 1937 the rolling stock consisted of 31 tank locomotives (wheel

types 0–4–0 ; 2–4–2) and 51 tender locomotives (wheel types 4–4–0 ; 4–6–0) all in good condition, 207 passenger coaches of the bogie type, and 958 goods trucks mostly in poor condition. There were also 6 self-propelled railcars comprising one Micheline-Diesel coach and five Decauville coaches. The main workshops are at Gialam with smaller ones at Phoimoi and Amichow. A type of French Micheline railcar on pneumatic tyres was used on the Chinese section and enabled the run from Hanoi to Kunming to be made in 22 hours at an average speed of 22 m.p.h. Between Hanoi and Haiphong an older type of car was in service. The total capacity

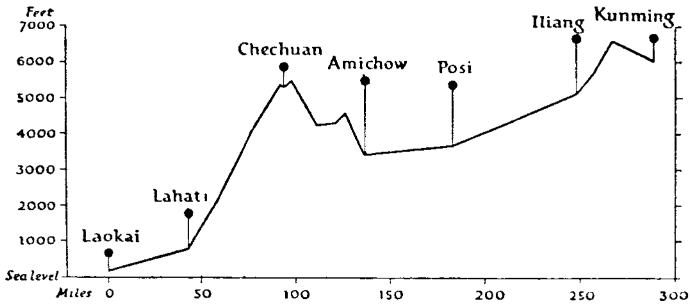

Fig. 87. Yunnan Railway, Chinese section, profile
Based on official sources.
Vertical exaggeration 100 times approximately.

of the line was about 9,000 tons per month in peace-time, and could be greatly increased by the construction of more passing loops.

The line proceeds in a north-westerly direction from Haiphong to the Chinese frontier, then veers sharply north-east. From Hokow to Mengtsz, a distance of about 60 miles, the line climbs from 100 ft. above sea-level to over 5,000 ft. with many tunnels and viaducts. The Namti valley, which the railway traverses, is gorge-like and practically confined to the river bed, and is described as one of the worse malarial regions to be found in Asia. The most important trestle viaduct (at mile 236) has a length of nearly 502 ft., and is approached at one end by a curve of 100 metres radius (Plate 133). North of Mengtsz the line goes through rugged country which English travellers have compared to parts of Dartmoor or the Peak District, although the elevation is much higher. Near Loshiutung the line crosses the watershed between the Red river and the Si kiang, and after a descent to Amichow (Kaiyuan), follows the comparatively easy valley of the Tacheng kiang to the basin in which stands the

town of Iliang. Beyond Iliang the railway turns west, winds through another deep gorge and then crossing a low pass at length emerges into the Kunming plain (Plate 134).

The character of the economic function of the railway is indicated in the following table of railway tonnage since 1931, classified according to the nature of the traffic :

Analysis of Traffic on the Yunnan Railway, 1931–37

Nature of Transit	1931	1932	1933	1934	1935	1936	1937
Haiphong docks to Yunnan	tons 23,186	tons 24,271	tons 24,665	tons 27,480	tons 30,328	tons 32,327	tons 33,402
Yunnan to Haiphong docks	9,721	9,635	10,645	9,963	10,540	12,530	13,356
Tongking to Yunnan	1,472	1,529	16,503	4,061	2,384	2,474	3,626
Yunnan to Tongking	1,009	784	436	552	1,220	2,700	2,056
Haiphong docks to Tongking	18,901	19,898	19,255	17,425	19,464	22,677	24,769
Tongking to Haiphong docks	4,727	11,776	31,117	27,465	13,606	41,327	32,985
Local Tongking	48,147	33,565	27,883	26,888	34,849	41,695	59,550
Local Yunnan	121,089	117,654	122,513	120,051	127,379	135,187	139,459
Total	238,252	219,112	253,017	233,885	239,770	290,917	309,203

Source : *Compagnie Française des Chemins de Fer de l'Indochine et du Yunnan, Rapport Commercial*, 1937, p. 53 (Hanoi, 1938).

This indicates that there has been little change in the nature and volume of traffic carried since 1931. It shows that in normal times the economic relations in the section of China served by the railway are so isolated that neither the world economic crisis of 1929–33 nor the economic dislocation within China in this period have had any serious effect upon them. Another fact is the preponderance of local traffic carried within Yunnan province, which in 1937 amounted to 41 per cent. of the total traffic. Nearly half this local traffic is in coal and lignite, which are mostly carried between the Kaopaochun coalfields at Iliang and Pishihtsai in the vicinity of the Kochiu tin mines. Next to the coal, the principal commodities in the local traffic, in order of their importance, are rice and paddy, soya beans, charcoal, salt, timber, and cotton goods.

The most interesting aspect about the international trade is the

predominance of two commodities, namely, tin accounting for 80 per cent. of the exports, and cotton yarn accounting for 30 per cent. of the imports of Yunnan. Petroleum, chemical products, manufactured goods, tobacco, and paper are also of importance in the import trade, and animal skins and pharmaceutical products in the export trade. The figures show that as a means for the French economic penetration of Yunnan, the railway has not been very successful. This is partly due to the policy of isolation adopted by the French in order to prevent the infiltration of Chinese anti-imperial ideology from China into French Indo-China, and by China to check the growth of an alien economic penetration and political influence.

In 1915 the Chinese government began the construction of a 2 ft.-gauge light railway from Pishihtsai through Mengtsz to Kochiu, the tin-mining centre. The line, which is 43 miles long, was not finished until 1928. It was subsequently extended via Lingan from Chikai to Shihping, and it is proposed to continue it south-west to Szemao (Plates 40, 135).

(20) *Kwangchiu Railway* (*Canton–Kowloon*)

In 1898 the British and Chinese Corporation obtained a concession for the construction of a railway between Canton and Kowloon. The line, completed in 1911, falls into two well-defined sections. The first 90 miles between Canton and the frontier station at Shamshun is in Chinese territory and the last 22·5 miles to Kowloon in British leased territory (see vol. ii, p. 338).

The line is standard-gauge and single track; the ruling gradient in the Chinese section is 1 : 150 and in the British 1 : 100, and the maximum curves are 6 per cent. There are many bridges, of which the principal ones are over the Sientsun, Shektan, Pekong, Kansui, Tung, and Tungkun rivers. In 1936 the equipment consisted of modern rolling stock including passenger coaches of corridor type, and bogie goods wagons of 30 to 40 tons' capacity (Plate 136). The 'Diesel Express,' running between Canton and Kowloon, did the through trip in 2 hrs. 55 mins.

From Canton the line follows an easterly course through low-lying country, much intersected by rivers and waterways to Sheklung. It then turns in a south-easterly direction through hilly country to Taiping and thence to Shamshun. By mutual consent the Chinese and British sections maintained a through service before the war. In 1934 a new through-traffic agreement was signed, the terms of which were more favourable to China than a former agreement of

1911. Under the 1934 agreement the Chinese section received 72 per cent. and the British section 28 per cent. of the total proceeds of the through-traffic service instead of respectively 65 per cent. and 35 per cent. as formerly. Outgoing goods traffic consisted mainly of wood-oil, antimony, cotton, bristles, and camphor. The importance of the railway was increased by the completion of the Canton–Hankow line in 1936 and of the loop-line connecting the two systems in 1937 which gave Kowloon direct rail communication with central and northern China.

WAR-TIME DEVELOPMENTS, 1937–44

Many facts regarding Chinese railways are now difficult to ascertain owing to war-time conditions. Certain railways are partly in Chinese and partly in Japanese hands, and until hostilities are concluded the situation will remain unstable. In addition to this a large proportion of the traffic is of a purely military nature; hence accurate figures for yearly returns and traffic cannot be given.

The programme of expansion undertaken by the National Government was cut short by the outbreak of hostilities. Most of the lines, located as they are in the eastern part of the country, have been either lost or destroyed. Large sections have been torn up by the Chinese in the course of war operations and have not been rebuilt by the Japanese. Many of the railways have been the scene of heavy fighting and have suffered great damage and much loss of rolling stock and other equipment. Moreover, the Japanese have in many cases failed to keep the much used railways in territories under their occupation well repaired and normally supplied. Chinese efforts to continue construction in the interior have been severely handicapped and practically brought to a standstill by lack of capital resources.

RAILWAYS IN 'FREE CHINA'

General Conditions

Owing to their location in the eastern parts of China most of the railways became extremely vulnerable when war broke out, and many of them were soon lost to the enemy. In September 1942, only 712 miles, that is, about 10 per cent. of all lines constructed before the war, were in operation in 'Free China.' Statistics of the Ministry of Communications show that up to that time 750 miles were under construction.

In 1937 the Chinese Ministry of Railways underwent readjustment and reorganization. The Head Office was established at Hankow, while branch offices were opened at Chungking and Siangtan, but in the following year Hankow fell into Japanese hands. In January 1938 the Ministry of Railways was merged into the Ministry of Communications, the new organization retaining the name of the latter.

The Sino–Japanese war has greatly modified the position with regard to rolling stock, a considerable proportion of which was destroyed or damaged during hostilities. In certain cases the rolling stock has fallen into Japanese hands and is being used on lines under Japanese control, while the remainder is used on the Chinese-controlled sections.

Many of the railways constructed prior to 1937 proved invaluable in maintaining the communications of 'Free China' with the outside world, and have played vital parts in the struggle of China against Japan during the last seven years. For months the Canton–Hankow railway was the lifeline of the National Government, and was subject to incessant bombardment by Japanese aircraft. When Canton fell in October 1938 the Chinese had to rely on the uncompleted south-west line from Heng-yang through Kweilin and Nanning to French Indo-China and on the Yunnan Railway as its two main railway communications. After the loss of Nanning in November 1939 the former was cut and the control of French Indo-China by the Japanese isolated the northern half of the Yunnan railway to Kunming. It was for this reason that, prior to the loss of Burma, every effort was made to complete the railways from Kunming to Sui on the Yangtze, and to Kunlong on the Burma frontier, 100 miles east of Lashio. In the north, the western part of the Lunghai Railway remained under Chinese control and served as the principal artery of trade with Honan and Shansi.

The exact position with regard to government railways in 'Free China' is very obscure and varies from time to time with the fluctuations of the war. In 1943 there were two separate groups of lines, one north and one south of the Yangtze.

(1) The first group with Chengchow as centre consisted of (*a*) the Chengchow–Sinyang section (179 miles) of the Peiping–Hankow railway, and (*b*) the Chengchow–Paoki section (440 miles) of the Lunghai Railway, together with branches. Traffic on these lines was almost entirely military, and on the latter route trains were run by night only between Chengchow and Tungkwan, as the line,

closely following the bank of the Hwang ho, was under fire from Japanese troops holding the northern bank. During the summer of 1944 the Japanese advanced further west, and according to some reports occupied additional stretches of the main Lunghai Railway.

(2) In the second group, Chuchow junction on the Canton–Hankow railway occupied a similar position to that of Chengchow in the north, but here also the length of line under Chinese control varies from time to time as the opposing forces gain or yield ground. In 1943 there were in operation in this group :

Railway	Section in operation	Length
		miles
Canton–Hankow	Shiuchow–Siangtan	305
Hunan–Kwangsi	Hengyang–Laiping and branches	402
Kweichow–Kwangsi	Liuchow–Chelin	143
Burma	Kunming–Anning	22
Kunming–Sui	Kunming–Kutsing	99
Yunnan	Kunming–Pishihtsai and branches	290

East of the Canton–Hankow railway the Chekiang–Kiangsi line was, until the loss of Chuchow, open to a point not far from Nanchang ; certain sections were taken up to provide rails for the line to Liuchow. Nanchang itself was in Japanese hands, but a bus service operated with a slight detour south of Nanchang to the rail-head east of the town where the railway was still in operation to Kinhwa. The section between Kinhwa and Hangchow had been destroyed by the Chinese. According to the latest reports the greater part of the Chekiang–Kiangsi railway has now been destroyed. The Hunan–Kwangsi line from Hengyang to Liuchow was in full operation until the summer of 1944 and a new section from Liuchow through Hochih to Tushan had been completed. In the south-west the Yunnan Railway was dismantled for some 50 miles from the frontier, soon after the Japanese landed troops in French Indo-China ; the materials were used to construct the new line between Kunming and Kutsing.

During the period from October 1941 to the end of August 1942 more than 9,000,000 passengers and 3,200,000 troops were carried by all the Chinese-controlled lines, which also hauled more than 1,200,000 tons of freight and half a million tons of military supplies.

As a result of the Japanese successes in southern China during the summer and autumn of 1944, the railway position had worsened considerably in 'Free China.' The important Canton–Hankow and Hunan–Kwangsi lines had been lost and the Japanese were within sight of attaining their proposed Shanghai–Singapore railway. This would probably utilize the following sections of railways in China: (1) Shanghai–Hangchow (Shanghai–Hangchow–Ningpo railway), (2) Hangchow–Nanchang–Pinghsiang (Chekiang–Kiangsi railway), (3) Pinghsiang–Chuchow–Hengyang (Canton–Hankow railway), (4) Hengyang–Liuchow–Laiping (Hunan–Kwangsi railway), and (5) a new section from Laiping to the French Indo-China frontier via Nanning, following the line of the projected extension of the existing Hunan–Kwangsi railway. The Japanese, however, will also find it necessary to control the Hangchow–Hengyang section over its full length and undertake considerable reconstruction of the portions destroyed by the Chinese before this ambitious railway project can be realized. Since, however, by the end of 1944 the Japanese also controlled the full length of the Peiping–Hankow railway, a Peiping–Singapore railway was possible if the Hunan–Kwangsi line were linked with the French Indo-China system.

New Construction in 'Free China'

Among the railway projects undertaken since the outbreak of war are the following (Fig. 88):

(i) *Hukwang Railway* (*Hengyang–Chennankwan*)

From Hengyang in Hunan this standard-gauge line, usually known as the Hunan–Kwangsi railway, is planned to run 640 miles to Chennankwan on the frontier of French Indo-China, where it will join an extension of the Hanoi–Langson railway. The first section of 224 miles from Hengyang to Kweilin was completed in twelve months and opened to traffic in December 1938. Beginning on the eastern bank of the Siang river at Hengyang, it passes through Kiyang and Lingling and enters Kwangsi province by way of Tun-gan; thence it continues through Chuanhsien, Hingan, and Ling-chwan to Kweilin. It played an important part in the evacuation of Hankow and Canton and in the removal of both governmental and private properties from the war area. The construction of the second stretch of 108 miles from Kweilin to Liuchow began in August 1938, and it was opened to traffic in December 1939. Both

Plate 133. Railway bridge, Yunnan Railway
The cantilever bridge of the Yunnan Railway in the Namti valley, south of Mengtsz.

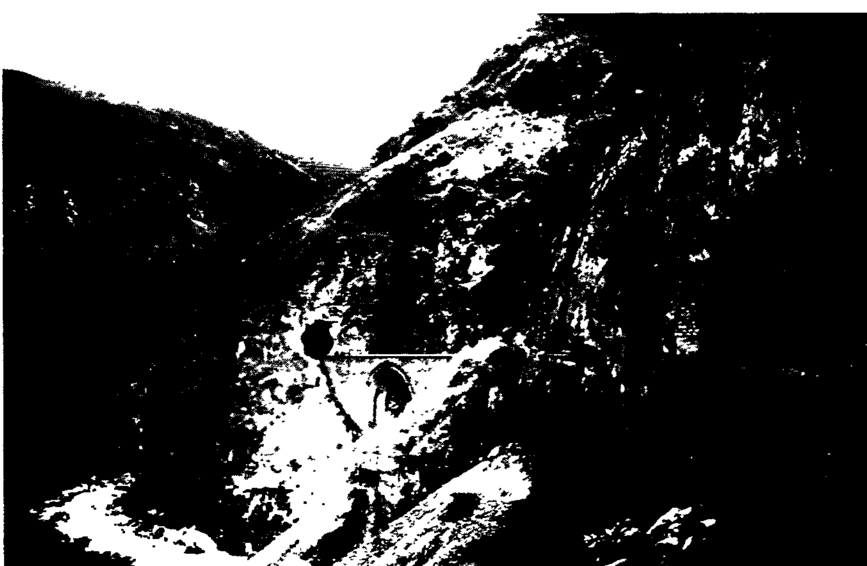

Plate 134. Railway viaduct, Yunnan Railway
A viaduct and tunnels in a gorge between Iliang and Kunming.

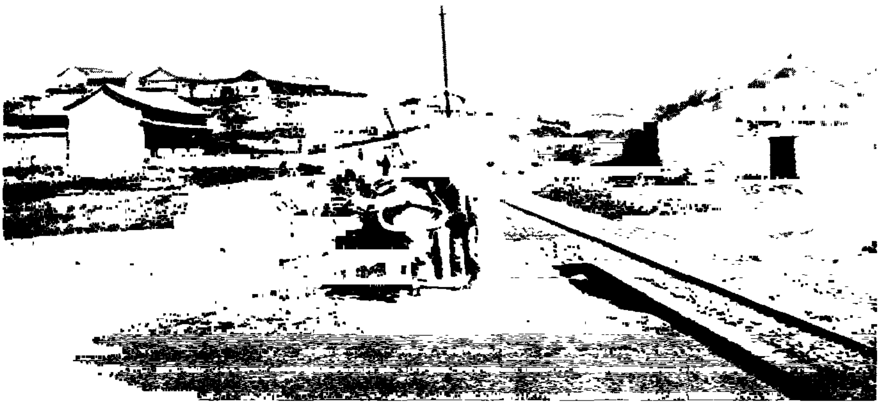

Plate 135. Pishihtsai railway station, Yunnan
Ox carts and pack animals bringing goods to the station at Pishihtsai, where a narrow-gauge line links up with the Yunnan Railway.

Plate 136. Canton–Kowloon railway
A passenger train of the Canton–Kowloon line at Hung Hom, Kowloon peninsula: Hong Kong island and the city of Victoria can be seen across the bay.

the above sections pass through territory which is famous for its agricultural products, primarily rice, followed by beans, peanuts, wood-oil, and tea, and the potentialities of peace-time traffic are very great.

Work on the third section between Liuchow and Nanning was begun in 1938 but was suspended in December 1939, following the temporary enemy occupation of Nanning. The fourth section, 146 miles in length, connects Nanning with Dongdang station on the French Indo-Chinese state railway about 3 miles from Chennankwan, and traverses a difficult terrain. As required by the loan agreement, engineering work was entrusted to the French and was inaugurated in April 1938 at the Chennankwan end. By December 1939 rails were laid over the 42-mile section from Dongdang to Ningming, but after the loss of Nanning work was suspended and part of the rails taken up and carried into French Indo-China.

(ii) *Kweichow–Kwangsi Railway* (*Liuchow–Kweiyang*)

When completed this line will link Liuchow with Kweiyang. Surveying work began in April 1939. Building materials have been drawn from the Hunan–Kweichow railway and also from certain dismantled sections of the Chekiang–Kiangsi. Traffic was opened from Liuchow to Chinchengkiang near Hochih (99 miles) at the end of January 1941. Work was continued on the section between Hochih and Kweiyang, and until the autumn of 1944 trains were being run as far west as Tushan in Kweichow. The Japanese advance through Kwangsi and into Kweichow then caused the suspension of further work.

(iii) *Burma Railway* (*Kunming–Lashio*)

The construction of a railway linking Yunnan and Burma was suggested by British engineers over seventy years ago and from recent reports it seems that it will in general follow the route surveyed in 1899 by H. R. Davies. In his plan for the reconstruction of China, Dr Sun Yat-sen also proposed the building of this trunk line, but no concrete steps were taken until the outbreak of the Sino-Japanese war. Surveying work began in July 1938, and within a year it was reported that about 25 per cent. of construction had been completed from the Kunming terminus. Doubts were entertained on the British side as to the economic value of the railway, and it was not until April 1941 that the Secretary of State announced in the British

Parliament that Great Britain had decided to finance the construction of the Lashio–Kunlong extension of the Burma railways to link the latter with the Chinese railway system. Work on the Burma section was then started, but was interrupted by the Japanese occupation of Upper Burma in 1942. On the Chinese side, owing to shortage of materials, work has stopped, though it is reported that the railway is open and completed from Kunming to Anning.

The magnitude of the task confronting the Chinese engineers in the construction of this 500-mile length of railway on that side of the frontier is probably comparable with no other line in the world except perhaps the Trans-Iranian railway, so long is the aggregate length of very difficult country traversed. The first hundred miles of the alinement beyond the frontier fixes itself, as it must follow the Namting, a tributary of the Salween, which is conveniently straight and leads in the exact direction required, precisely to an abnormally low pass (5,600 ft.) in the great Salween–Mekong watershed ; this pass is an obligatory point for any line of railway following the general route. Due to its low altitude (1,500–2,500 ft.) the first 50 miles of the ascent up the Namting valley are notoriously unhealthy, but the valley then rises rapidly through more rugged country. Beyond the watershed the next 100 miles are probably the most difficult on the whole railway, and include the negotiation of the Mekong gorge, a very steeply graded rise—possibly with 1 : 25 grades and considerable artificial development of length ; thence in a north-easterly direction to the Mekong–Red river watershed (6,500 ft.) and another switchback out of the Red river basin via Nankien.

From near Siakwan, the trade mart of western Yunnan, the Burma Road is bound to be closely followed all the way to Kunming. Actually Siakwan, Tali, and Liki-ang may some day be served by a branch line. The highest point on the railway is likely to be 8,000 ft., some 70 miles east of Siakwan, beyond which the country is somewhat easier as the line grades down to Kunming by way of Anning.

The above is known as the southern route to Burma and passes through only moderately rich territory, where the general backwardness seems to be due to the prevalence of a malignant form of malaria. Some authorities advocate the use of the northern route through Tali, Paoshan, and Tengyueh to Bhamo on the ground that the region traversed is more densely populated and economically better developed. The decisive argument in favour of the southern

route is that engineering problems are much less difficult than in the case of the other.

Although the strategic importance of the line outweighs its economic worth at the present time, attention is being given to the latter.

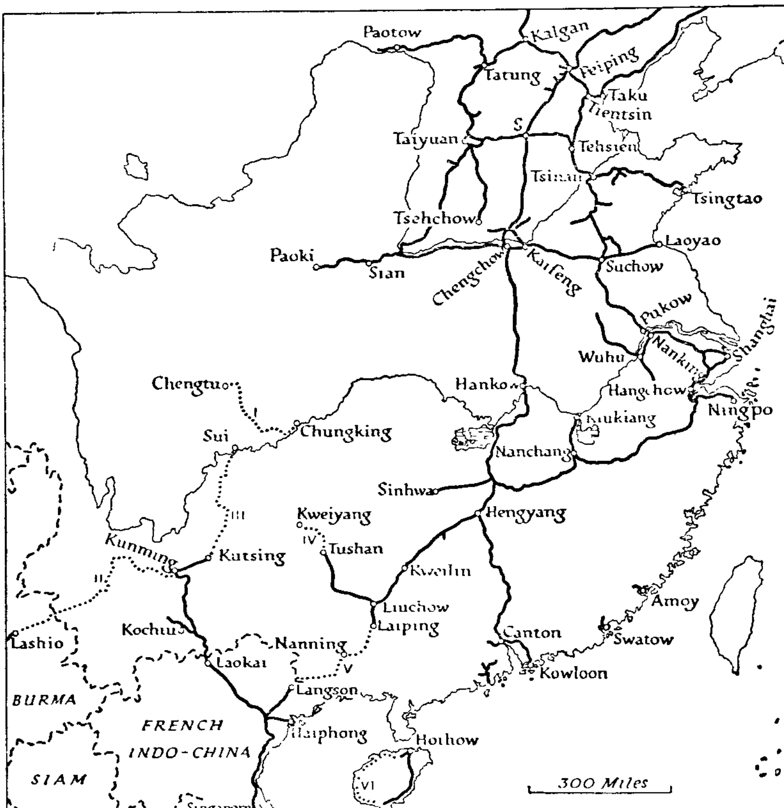

Fig. 88. Railways, 1943

Based on 1 : 2,000,000 *Asia Transportation Map* (Washington, 1944). S, Shihkiachwang. The Roman numerals indicate the approximate alinement of the projected Chungking–Chêngtu (I) and Burma (II) railways and of the unfinished Kunming–Sui (III), Kwangsi–Kweichow (IV), Hunan–Kwangsi (V), and Hainan (VI) railways. No indication is given of lines destroyed in the course of the war.

The railway is economically important for three reasons :

(1) It provides an alternative to the Yunnan Railway. This is important to the economic development of the south-west since the French railway is notorious for its high freight rates, which have hindered the development of this region as well as that of the railway

itself. It is argued that the former line is in no position to offer competition since the rail haul between Kunming and Rangoon is about twice that between Kunming and Haiphong. This does not take into account the possibility of using the Irrawaddy river from Mandalay to Rangoon and disregards the fact that Rangoon is situated much nearer to Europe. These advantages may compensate for the greater length of the Burma route.

(2) The railway will help to increase trade between south-west China and Burma. The economic development of the south-west creates demands for new commodities and opens up new possibilities for developing the export trade.

(3) The railway will open up a new route for China's trade with Europe, most of which formerly passed through the Pacific ports, especially Shanghai, Tientsin, and Canton. It is possible that Yunnan and Szechwan will remain two important centres of economic development when the war is over, and such a railway would tend to orientate the economy of these two provinces and indeed the whole of the south-west towards the Indian Ocean.

(iv) *Kunming–Sui Railway*

The Chinese are building a metre-gauge line from Kunming to Sui in Szechwan, on the north bank of the Yangtze where that river is joined by the Min. Out of a total length of 500 miles the Chinese state that they have completed about 100 miles between Kunming and Kutsing. From Kutsing the line is to go to Suanwei, thence to Weining in Kweichow, and northward to Sui. The going is fairly easy to Suanwei, then extremely difficult to Weining, and there are bad patches between Weining and Sui. The Weining-Sui section follows the valleys of the Bokwei river and the Hengkiang, both of which flow through narrow and precipitous gorges.

The completion of the Kunming-Sui and the Burma railways will provide through railway communication between Rangoon and Sui, a distance of nearly 2,000 miles. From Sui the Chinese propose to construct a railway to Neikiang in Szechwan, about halfway between Chungking and Chêngtu, which cities are also to be connected by rail. The Burma–Yunnan–Yangtze railways will then be connected with a large part of western and southern China, of which the industrial and commercial development will be correspondingly quickened. Thus, while the immediate object of the Burma–Kunming–Yangtze system is military, its long-term commercial importance ought to be considerable.

(v) *Chêngtu–Chungking Railway*

Most of the stone and earth work on this road has been completed, but owing to shortage of materials there is no immediate prospect of plate-laying. It is proposed to extend this line to Paoki on the Lunghai Railway by way of Ninkiang and Liupating.

(vi) *Hunan–Kweichow Railway* (*Chuchow–Kweiyang*)

The Hunan–Kweichow line has been under constant threat from the enemy, and has been completed only from Chuchow to Sinhwa. In peace-time it will have considerable economic importance since it will draw the resources of Kweichow to the lower Yangtze valley and especially to the transport facilities of the Hankow–Canton railway.

(vii) *Lunghai Railway* (*see* p. 480)

Paoki–Tienshui. This is a projected extension of the Lunghai Railway, linking Paoki and Tienshui. The upper Wei ho valley, through which the line will run, is very rugged, and no fewer than 107 tunnels with an aggregate length of 14 miles will have to be cut through mountain-sides. By the summer of 1942, 37 per cent. of the engineering work had been completed. Surveying work on a line of 466 miles from Tienshui to Chêngtu has also been completed.

Sienyang–Tungkuan. This branch line, now completed, starts at Sienyang on the Lunghai Railway, 14 miles west of Sian, and follows a northerly direction through Sanyuan, Fuping, and Yaohsien to Tungkuan, over a distance of 86 miles. It crosses the King ho and two smaller rivers. The 70-mile stretch from Sienyang to Yaohsien is relatively level and offers no serious engineering difficulties, but that from Yaohsien northward goes through a mountainous terrain. There are two tunnels with a total length of 400 yards; the bridges are constructed entirely of wood. The line was constructed primarily for the purpose of supplying and transporting the coal of Tungkuan for railway use.

Railways in Occupied China

General Conditions

Railways in Japanese-occupied China have been largely placed in the hands of two Japanese-sponsored companies—the North China Railway Company and the Central China Railway Company, while

Japanese-controlled railways in Kwangtung province and certain unpacified areas are administered directly by the military authorities. Both the companies mentioned above have been incorporated under Japanese law and financed entirely with Japanese capital. The North China Railway Company was established by the North China Development Corporation, a Japanese concern which co-operates closely with the military authorities. The new company abolished the former separate administrations and divided the system into six divisions with offices at Peiping, Tientsin, Tsinan, Suchow, Kalgan, and Shihkiachwang. Even before the outbreak of the Pacific war, the lines comprising this system operated at a loss and no payments of interest or capital redemption to foreign holdings were made, with the exception of the interest on the Peiping–Mukden loans. The Central China Railway Company is a smaller concern than its northern counterpart. The president is a South Manchurian Railway nominee, and the system is divided into two divisions with headquarters at Pukow and Hangchow.

Of the railways under Japanese control those in regular operation far behind the many battle fronts suffer from frequent interruption by Chinese guerillas, those near the fronts are in use for military traffic or not at all. Many lines separating Chinese and Japanese forces have been taken up, notably short sections east and west of Chengchow, the entire Hangchow–Ningpo line, and large stretches of the Chekiang–Kiangsi railway. The Japanese-controlled lines are divided into three distinct groups :

(1) All railways north of the Yellow river and some to the south are operated as one unit by the North China Railway Company. The southernmost station on this system is Pengpu and the system is separated from the Chinese-controlled railways by the cuts round Chengchow. Its route mileage is about 3,200 miles.

(2) The railways in Kiangsi and parts of the adjacent provinces are operated by the Central China Railway Company. This network joins the North China railway system at Pengpu and extends south to Hangchow, west to Wuhu, and includes the Hwainan line.

(3) The other lines are isolated sections, all in vulnerable areas, and those in operation are worked by the military authorities. They included in 1943 a short section of the Peiping–Hankow line out of Hankow, the Kiukiang–Nanchang line, and the Wuchang–Yochow section at the north end of the Canton–Hankow railway. The Kwangtung or southern section appears to be divided into two

lengths. From Canton to Sunkai (25 miles) the line is open to a limited volume of passenger traffic. From Sunkai to Yingtak, a distance of about 55 miles, the rails are reported to have been taken up, and from Yingtak the line is believed to be in Chinese hands. The Canton–Samshui and the Canton–Kowloon railways are also under Japanese control.

New Construction in Occupied China

The unification of the system has led to considerable construction work and several new sections have been completed (Fig. 88):

(*a*) *Peiping–Jehol Railway*

This new strategic railway from Peiping to Jehol city provides an alternative line to Manchuria. The first 80-mile section between Peiping and the frontier station Kupeikow on the Great Wall was officially opened in April 1938, and it is probable that the track has now been completed.

The total length of the railway from Peiping to Jehol is 142 miles, and it is standard-gauge and single-track throughout. There are 21 intermediate stations and halts, each with a crossing loop, but only temporary station buildings have been erected, consisting of wooden huts for staff, passengers, and goods. Kupeikow has 4 loop sidings and special huts for the Customs service. It is situated near the summit of the line in the Kupeikow pass through the frontier mountain range, at the point where the railway crosses the Great Wall of China.

In the first 50 miles from Peiping the line crosses the plains south of the mountains, and has numerous small bridges and flood openings of a temporary nature. The mountain section has 12 tunnels, 5 reversing stations, and the longest section between them is about 1¼ miles; the summit level is 2,200 ft. above the Peiping terminus level. There is no ruling gradient, nor compensation for curvature; the steepest gradient is about 1 : 25. The permanent way consists of second-hand 60-lb. rails on wooden sleepers, the rails having been supplied from the stocks available from the former Chinese Eastern Railway, sections of which have been replaced with heavier rails, since the conversion from the Russian 5 ft. to standard-gauge. There is no through line at Kupeikow where Manchurian territory is entered; a short distance at this point has to be traversed by bus.

(*b*) *Tatung–Taku Railway*

This 342-mile railway is reported to be under construction by the Japanese. It will connect Tatung, the coal-mining centre of Shansi, with the port of Taku. Its completion will enable coal to be transported from the Shansi mines to Taku and thence to Japan.

(*c*) *Tehshih Railway* (*Tehchow–Shihkiachwang*)

Constructed by the Japanese and opened to traffic in 1940, this railway provides a vital link between Tehchow, on the Tientsin–Pukow line, and Shihkiachwang on the Peiping–Hankow line. It is 112 miles long, standard-gauge and single-tracked, although the bed is wide enough for a second track to be constructed. It is of great economic as well as military importance, since it gives the trade of Shansi province direct access to the sea.

(*d*) *Piensin Railway* (*Sinsiang–Kaifêng*)

Following the occupation of Suchow the Japanese began operations against the Lunghai Railway in June 1938, with Kaifêng and Chengchow as their main objectives. After Kaifêng was captured the retreating Chinese breached the dykes of the Hwang ho at Chungmow, 6 miles east of Chengchow, and in this way stopped the enemy from operating in the area. The Japanese, therefore, built a 64-mile loop-line joining Sinsiang on the Peiping–Hankow railway with a town opposite Kaifêng on the Lunghai Railway, completing it in the spring of 1940.

(*e*) *Tungpu Railway* (see p. 479)

The Japanese have completed the construction of this line between Yuanping and Tatung, and have converted the sections built by the Shansi provincial government to standard-gauge.

A branch line has also been built by the Japanese from Tungkwanchen to Luan, primarily for military reasons. It is about 150 miles in length and the southern part of it lies through difficult mountain country.

(*f*) *Pingsui Railway* (see p. 477)

A branch line has been constructed for the transport of coal from Shilachi to Paotow, the terminus of the Peiping–Suiyuan railway.

(*g*) *Shanghai–Hangchow–Ningpo Railway* (see p. 485)

There are reports that single-track light railways have been constructed from the Shanghai–Hangchow sections of the main line to

the coast, e.g. Chinshan to Chapu. This is part of a Japanese plan to strengthen the coastal defences in the Shanghai area.

(*h*) *Hankow–Ichang Railway*

According to unconfirmed reports a railway has been constructed linking the Peiping–Hankow line with Ichang on the Yangtze kiang.

(*i*) *Hainan Railway*

The Japanese are reported to have built a metre-gauge railway along the eastern, southern, and western coasts of Hainan. From Hoihow on the north coast it passes through Kiungchow, Lokwei, Lingshui, Yulim, Aihsien, Fuflo, Kenen, and Tonteau. The construction materials were brought from Tokyo.

(*j*) *Chengtai Railway* (see p. 478)

It has been reported that this metre-gauge line has now been completely converted to standard-gauge by the Japanese.

A Post-war Programme

The most immediate need at the end of the war will be the reconstruction and general rehabilitation of the existing network, and this will probably be undertaken during the first two years of peace. There will then follow a programme of expansion, since the most logical approach to the industrialization of China is through railway development. But China may not be able to procure an unlimited supply of capital goods, particularly steel, when the war is over, and it may be necessary to confine the programme of railway construction to the most essential requirements.

Of the post-war programmes, that put forward by Chang Kia-ngau (Chinese Minister of Communications, 1937–42) is the most interesting. He believes that a ten-year programme covering the construction of 14,300 miles of railroad should be launched in two stages. It is claimed that the conclusion of such a programme would be of equal advantage to China and the foreign Powers. The purchasing power of the Chinese people would be increased and a fair part of the manufactures of the industrial nations could find a market in China. At the same time the growth of the railway system will increase China's productive capacity, enabling her to produce more for export and thus to supply part of the raw material needs of the industrial countries. By assisting China in the development of her

railways the individual Powers will help China to increase her production and to pay back her loan obligations. It will thus be a reciprocal arrangement beneficial to both the creditor and debtor nations, an arrangement that will foster and strengthen the economic ties between nations and serve to stabilize the peace of the world.

The First Stage

During the first stage 7,155 miles should be built, with the primary object of knitting together all the political and military centres of the country and of assisting in the development of the most essential mineral resources. The following projects will have to be completed:

1. In the north-west: Tienshui–Chêngtu (445 miles); Tienshui–Urumtsi (1,500 miles), an extension of the Lunghai Railway; Lanchow–Changtu (1,000 miles), an important link between the two provinces of Tsinghai and Sikang.

2. In the south-west: Chêngtu–Changtu (940 miles); Szechwan–Kweichow (400 miles), connecting the Chêngtu–Chungking railway in the north with the Kwangsi–Kweichow railway in the south; Kweiyang–Weining (380 miles), destined to be the most important route between Kweichow and Yunnan; Hunan–Kweichow (620 miles), an extension of the Chekiang–Kiangsi railway, which is to be the most important east-west trunk line south of the Yangtze.

3. In the south-east: Nanking–Kiangsi–Fukien (620 miles), an extension of the Kiangnan Railway, which will provide an important link between the province of Fukien and Nanking.

4. In Central China: Chungking–Pukow (1,250 miles), running from Chungking through Tzeyang, Siangyang, and Sinyang to Pukow, opposite Nanking. It will constitute another east-west trunk line north of the Yangtze, linking together the north-south trunk lines of the Tientsin–Pukow and Peiping–Hankow railways.

The Second Stage

During the second stage, a total of 7,145 miles of important trunk lines will have to be considered to develop the frontier and coastal provinces and to open up more overland routes to the neighbouring countries.

1. In the north-west: Urumtsi to the Russian border (450 miles), linking up with the Russian system at Ayakurz; Kweisui via Urga to the Russian border (1,000 miles) to link up with the Russian system at Irkutsk; Paotow–Lanchow (680 miles), knitting together the provinces of Suiyuan, Ninghsia, and Kansu.

2. In the south-west: Changtu–Darjeeling (750 miles), a valuable international route; Paan–Sadiya (500 miles); Szechwan–Hunan (500 miles), from Chungking through Fowling and Yuanling to Chensi, on the Kweichow–Kwangsi railway; Fuling–Sichang–Hsiangyun (350 miles), running from Fulin on the Chêngtu–Tatsienlu railway through Changtu and Huili to Siangyun on the Burma Railway.

3. In the south-east: Kwangtung–Kiangsi (370 miles), from Shiuchow on the Canton–Hankow railway through Kanhsien and Kian to Nanchang; Samshui–Kweilin (320 miles), through districts noted for their rich antimony and coal deposits; Fukien–Kwangtung (650 miles), from Yenping on the Nanking–Kiangsi–Fukien railway through Yungnan and Meihsien to Canton; the Kwangchowwan extension of the Hunan–Kwangsi railway (250 miles), providing direct sea outlet for the railway network in the south-west; Nanning–Yamchow (125 miles); Kanhsien–Swatow (250 miles).

4. In Central China: Tsinan–Neihwang (200 miles), from the terminus of the Tsingtao–Tsinan railway to Neihwang on the Peiping–Hankow railway; Sian-Siangyang (250 miles); Kwangyuan–Tzeyang (500 miles), connecting the Tienshui–Chêngtu railway via Hanchung with the Chungking–Pukow railway and providing the much-needed direct route from the north-west to Central China.

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2. The following periodicals from time to time carry articles of interest on various aspects of China's railways: *Asiatic Review* (monthly, London)—particularly Wang, C. C., 'The Canton–Hankow Railway,' vol. xxi, pp. 392–400 (1936); Maspero, G., 'The Chinese Railways To-day,' vol. xxxiii, pp. 555–65 (1937); Cantlie, K., 'Some Aspects of the Rehabilitation of China's Railways,' vol. xxxiii, pp. 812–32 (1937); *Far Eastern Survey* (fortnightly, New York)—Chen Han-seng and Farley, Miriam S., 'Railway Strategy in China,' vol. vi, pp. 165–73 (1937); *Railway Gazette* (weekly, London)—'General Hammond's Report on the Chinese Railways,' vol. lxvii, pp. 391–3 (1937); 'The Peiping-Suiyuan Railway,' vol. lxvii, pp. 470–2 (1937); 'The French Indo-China-Yunnan Railway,' vol. lxxii, pp. 734–5 (1940); 'The Burma-China Railway,' vol. lxxiv, pp. 623–6 (1941);

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4. The 'Monthly Bibliography of Railways, in the issues of *Bulletin of the International Railway Congress Association* (monthly, Brussels), frequently lists books and articles giving information on Chinese Railways.

5. A useful map is: 1 : 2,000,000 *Asia Transportation Map*, 4 sheets (Washington, 1944).

Chapter XII

WATERWAYS

The North China Waterways: The Grand Canal: The Yangtze Kiang Waterways: The South China Waterways: The Si Kiang Waterways: Bibliographical Note.

From early times inland waterways have played a very important part in the economic life of China. Few countries are so well endowed with navigable rivers, whose usefulness has been materially increased by a long and extensive development of canals and artificial rivers. The absence of serviceable roads, the scarcity of beasts of burden, and the almost inexhaustible resources of man-power have combined to maintain the predominance of inland waterways as means of communication even to the present time. Future developments in road and railway construction are unlikely to challenge this predominance, and may rather serve to increase the significance of China's river systems as east-west routes by providing important north-south links. It is impossible to give accurate figures of the nature and extent of China's navigable waterways, but a recent estimate is as follows:

	miles
Open to steamers	4,000
Open in addition to steam launches ..	15,000
Open also to native craft of all kinds ..	27,000
Total ..	46,000

Source: Fang, F. A., 'Foreign Shipping in Chinese Waters,' *Chinese Economic Journal*, vol. viii, p. 249 (Shanghai, 1931).

For the purposes of description the inland waterways of China may be conveniently described under the following heads:

(1) The North China waterways
(2) The Grand Canal
(3) The Yangtze Kiang waterways
(4) The South China waterways
(5) The Si Kiang waterways

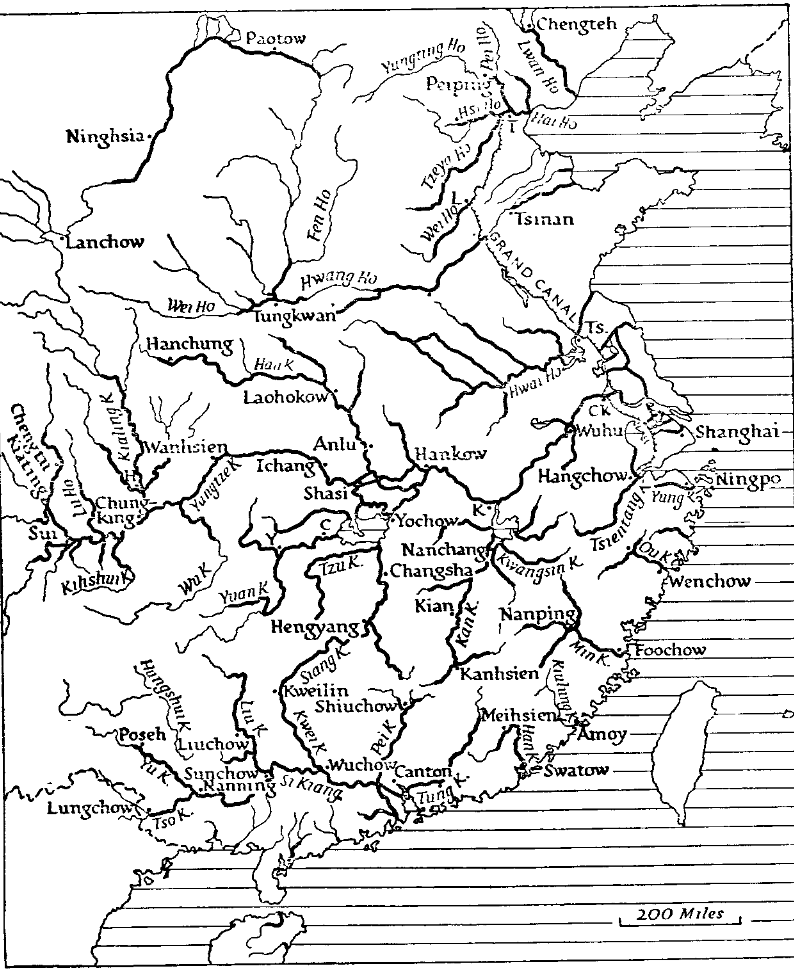

Fig. 89. Waterways

Based on Hermann, A., *Historical and Commercial Atlas of China*, pp. 82–3 (Cambridge, Mass., 1935).

The heavy black lines indicate approximately the navigable waterways.

C, Changteh; Ck, Chinkiang; H, Hochow; K, Kiukiang; L, Litsing; T, Tientsin; Ts, Tsingkiangpu; Y, Yuanling.

THE NORTH CHINA WATERWAYS

Except for the streams of the Shantung peninsula, which are of little significance for navigation, the rivers entering the sea north of the Yangtze all flow across the North China Plain and have common

problems of silting and flooding. In spite of the navigational difficulties thus caused, they, along with their numerous subsidiary artificial waterways, provide the most useful means of communication over the plain, particularly in an east-west direction. The Grand Canal, running north-south, provides the major connecting link between the various systems, which include :

(*a*) The Hwang ho
(*b*) The Hai ho system
(*c*) The Hwai ho system

The Hwang ho

The Hwang ho is the second largest river in China ; owing to the fact that parts of its upper course in Tsinghai have never been surveyed, estimates of its length vary from 2,700 to 3,000 miles. Though it drains a vast basin with a population of many millions, the physical characteristics of this great river render it unnavigable for vessels of any size, and its importance as a waterway is less than that of many smaller streams, and very much inferior to that of the Yangtze kiang.

The lower course of the river, prior to 1938, was north-eastward from Tungkwan through Honan and Shantung to the sea. In June 1938, the retreating Chinese armies blew up the retaining dykes at Chungmow, 20 miles north-east of the railway junction of Chengchow, flooded a large area of country between Chengchow and Kaifêng, and thus effectively prevented an immediate Japanese advance westward.

Accordingly, since June 1938 the main volume of the river has flowed from Chungmow south-eastwards through Honan and Anhwei along the course of the Sha ho, a tributary of the Hwai ho, and thence by the Hwai ho into Hungtze hu. From Hungtze hu it now flows north-east to reach the coast of Kiangsu, about 50 miles east-south-east of Haichow and near its mouth before 1853, when its course shifted north of the Shantung peninsula (vol. i, Fig. 13). Part of its waters, especially during floods, escapes southwards through Kaoyu hu and the Grand Canal into the Yangtze. The former bed of the river through Shantung is now reported to be practically dry.

Throughout its lower course the Hwang ho flows on a bed several feet above the level of the plain, and is confined by dykes, which are frequently broken during the floods of summer (see vol. i, pp. 31-2). The constant deposition of silt leads to the formation

of numerous shoals and sandbanks and to constant variations in the depths of the river. During winter, when the river is at its shallowest, it may be frozen.

Apart from a stretch of about 25 miles from its mouth and a series of isolated sections in Honan, available only for craft of $1–1\frac{1}{2}$ ft. draught, the lower Hwang ho is more a barrier than a means of communication. The provision of a single navigable channel of uniform depth throughout the year demands conservancy work on a gigantic scale, and is closely linked with the problem of flood prevention and the provision of facilities for irrigation. Prior to the outbreak of the Sino-Japanese war the National Economic Council through the agency of the Yellow River Commission had made a small beginning on this great task. The new diversion of the lower river will create new problems, not the least of those facing the National Government on the cessation of hostilities.

From Tungkwan to Hokow the trend of the Hwang ho is northwards, forming the Shensi-Shansi boundary. Over the greater part of this section there are numerous cataracts and falls, of which the Great falls at Lungwangchen (vol. i, Plate 1) are the most impressive. The river generally flows in a canyon and is largely inaccessible, especially in wet weather. In spite of these difficulties, small vessels descend this hazardous stretch of the river during parts of the year, being hauled around the most dangerous points (Plate 137). There is no traffic from November to April, when the river is generally frozen, and from July to September, when floods make navigation of any sort risky. Two large tributaries, the Wei ho and the Fên ho, enter the Hwang ho in this section; neither is of much value for navigation, but shallow-draught boats use the Wei ho for short distances.

From Hokow up river to Lanchow the Hwang ho bends first to the west and then, from the Ninghsia boundary, to the south. The section from Paotow, the Peiping-Suiyuan railway terminus, to Lanchow is the most important for navigation in the whole river. At many points sandbanks and rapids offer dangerous obstacles, but the gradient is only about half of that from Tungkwan to Hokow. During the low-water season from December to April the river is very shallow and subject to severe icing, but from the beginning of May to the end of June there is considerable traffic, mainly downstream. Goods from Tibet and the upper valley, mainly wool, are transported in flat-bottomed boats and rafts, supported by inflated skins, to the railhead at Paotow. Since 1935 steam launches were

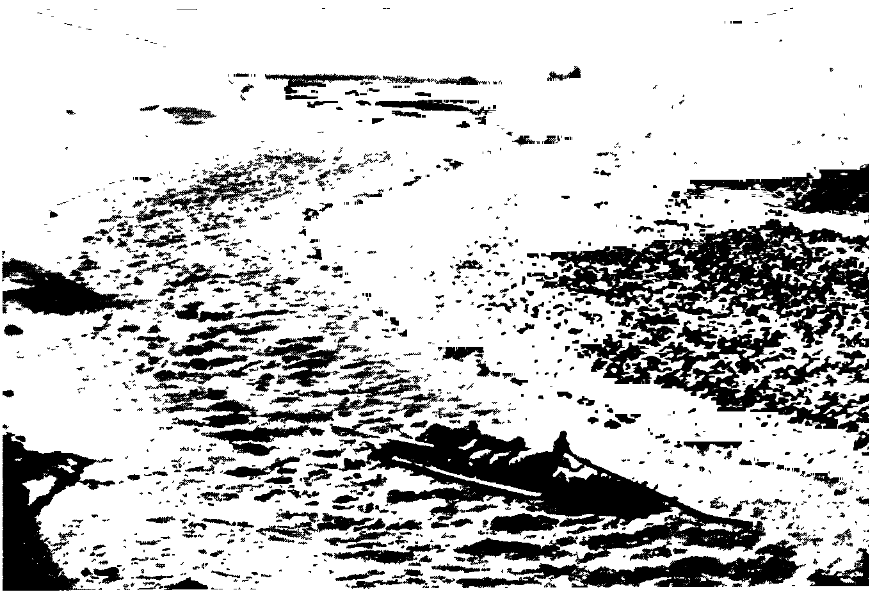

Plate 137. The Hwang ho, above Tungkwan

Above Tungkwan the Hwang ho is difficult to navigate, but small boats and rafts make much use of the river.

Plate 138. The Hwang ho, below Tungkwan

Below Tungkwan shallow-draught vessels can use some stretches of the river; this view was taken between Tungkwan and Shanchow

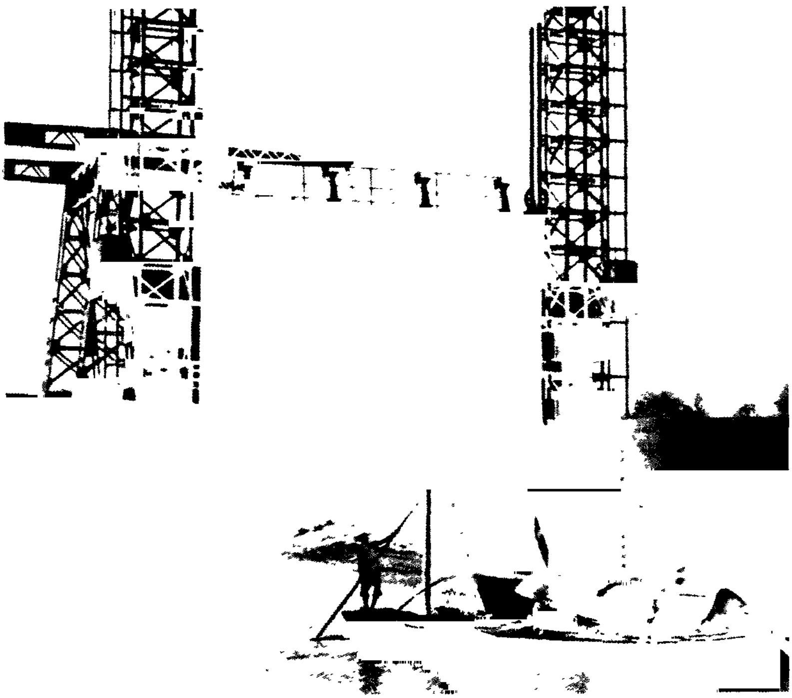

Plate 139. Dam on the Pei ho

One of a series of dams designed to control flooding and silting in the Hai ho system.

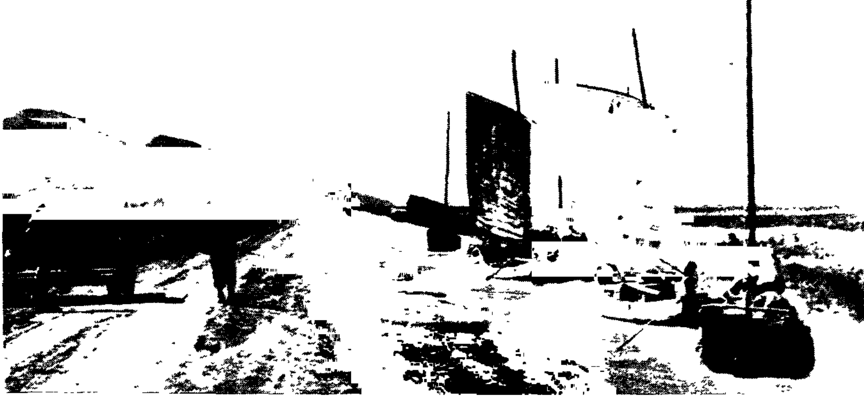

Plate 140. Salt junks, Kiangsu

The canals in the coastal plain of eastern Kiangsu are much used for conveying salt from the salt-pan areas.

introduced by the National Economic Council, but no regular services were maintained.

Above Lanchow the river becomes a mountain torrent, falling 8,000 ft. from its sources, and is entirely unnavigable.

The Hai ho System

North and south of the Hwang ho the North China Plain in Hupeh and Shantung has a dense network of canals and rivers. In winter, depths are shallow, and from mid-December to mid-March the whole system may be ice-bound for considerable periods, but during the remainder of the year, and especially in summer, these waterways are invaluable for the movement of commodities of all kinds, and carry an immense amount of junk traffic.

Of these by far the most important are the Hai ho waterways system and the Grand Canal (see p. 518), but there are a number of independent lesser streams of considerable local value as means of communication which can be conveniently considered along with the Hai ho system. They are generally difficult to enter from the sea owing to the presence of bars and banks at their mouths, but are navigable inland by small craft, especially after rains. The most important are the Luan ho, the Peitang ho, and the Siaoching ho. The Luan ho flows into the Gulf of Pohai about 32 miles south-west of Chinwangtao; its mouth is blocked by a mudbank, but flat-bottomed junks of about 1 ft. draught ascend to Jehol (Chengteh), the capital of Jehol, about 160 miles up river. The Peitang ho, whose mouth is about 8 miles north of Taku, is navigable for vessels of 10 ft. draught to the Peiping-Mukden railway bridge at Hanku. In its upper course it feeds a network of canals which are linked with the canal system of the Pei ho. The Siaoching ho, which enters the Gulf of Pohai west of Laichow wan, has a bar of least depth 7 ft. at its mouth. Vessels of up to 6 ft. draught travel to Yangkiokow, whence a canalized stream of 2–4 ft. least depth runs westward to Tsinan, to join up with the local canal system.

The Hai ho. Four large rivers, the Pei ho, the Yungting ho, the Hsi ho (Taching ho), and the Tzeya ho, and the Grand Canal (here known as the Yu ho or Yun ho) unite in the vicinity of Tientsin to form the Hai ho, which enters the Gulf of Pohai at Taku. These streams originally had independent outlets, but were conducted to a common outfall at Tientsin to facilitate the construction of the Grand Canal (see vol. i, p. 59). All, and especially the Yungting ho, are heavily laden with silt during the summer rains, and like the

Hwang ho are confined by dykes to prevent flooding. The constant silting, which reduces depths and leads to the formation of shoals and banks, and the icing which occurs during the severe frosts of winter, are serious hindrances to navigation. The work of the Hai ho Conservancy Commission in improving navigation facilities and controlling the destructiveness of summer floods has already been discussed (see p. 407). The North China River Commission has also been concerned in the conservancy work undertaken in this area (Plate 139).

From Taku to Tientsin the Hai ho is normally navigable to vessels of up to 13 ft. draught, and is of great significance by virtue of the fact that it links the great port and industrial centre of Tientsin with the sea (see p. 406).

Above Tientsin steamers and junks of shallow draught can reach Peiping by the Pei ho and a short canal running westward from Tungchow to the former imperial capital. This was part of the Grand Canal route for the transport of tribute rice from the Yangtze delta (see vol. i, p. 59). The Hai ho and its tributary rivers and canals provide a route from Tientsin westward to Tsingyuan (Paoting) and the Peiping–Hankow railway. Another water route runs south-west along the Tzeya ho and other streams to the centre of the plain.

In winter depths along these rivers do not exceed 4 ft., but increase to 14 ft. in summer; in addition to innumerable junks and small craft, regular cargo and passenger launch services utilize the main channels of the Hai ho system.

The Hwai ho System

Between Shantung and the Yangtze there is another complex of waterways, mainly tributary to Hwai ho, but also closely connected to the Yangtze and the Grand Canal, and providing the chief means of communication over large areas of the plains. The coasts, however, of eastern Kiangsu are low and fronted by extensive flats and shoals, rendering approach from the Yellow sea very difficult, except for small junks; the Kuan ho and the Linhung ho are of most importance in providing a link between the inland waterways of eastern Kiangsu and the coast. The Kuan ho, whose mouth is about 25 miles south-east of the artificial harbour of Lienyunchiang (see p. 383), is navigable for small steamers of 150 tons as far as Hsiangshuikou, 22 miles from the entrance. The Linhung ho, which is steadily silting up, is navigable to small vessels for about 8 miles south-west to the former Lunghai Railway terminus

of Tapu. From Tapu an important branch canal, the Yunyen ho, leads past Haichow to link up with the Grand Canal near Tsingkiangpu. Many of the canals in eastern Kiangsu carry frequent salt-barge traffic (Plate 140).

The Hwai ho. The Hwai ho, the principal stream between the Hwang ho and the Yangtze kiang, rises in southern Honan and flows eastwards, joined by many tributaries, to Hungtze hu. Its original outlet from Tsingkiangpu to the sea across northern Kiangsu was usurped by the Hwang ho from 1194 to 1853, and since then has silted up. Accordingly the Hwai is a river with no mouth, discharging its waters via Hungtze hu, Kaoyu hu, and the Grand Canal into the Yangtze. The Hwai is subject to the silting and the flooding common to all the North China rivers, but the problem is rendered more difficult by the absence of an independent outlet to the sea; the lakes and marshes of the Hwai basin act to some extent as reservoirs for the surplus flow, but in summer, when the discharge is estimated at fifty times that of winter, the system is hopelessly overloaded and disastrous floods are not uncommon (see vol. i, p. 62).

In spite of difficulties the Hwai system has long been the principal means of communication in south-eastern Honan and northern Anhwei. There is considerable junk, tug, and barge traffic along the rivers, lakes, and canals of the system, which generally have depths of about 2 ft. in winter and of 5 ft. in summer. The most important section is that along the Hwai ho itself from Sinyang east to Hungtze hu, which has acquired a new commercial importance since the building of the north-south Peiping–Hankow and Tientsin–Pukow railways (Plate 141).

Plans to deal with the problems of the Hwai ho have been mooted since early in the twentieth century, but although a Hwai River Commission was set up, nothing was achieved until the National Economic Council began a series of remedial measures in 1934. By the outbreak of war in 1937 considerable success had been achieved. In addition to improvements in the Grand Canal (see p. 521), which is closely linked with the Hwai system, a channel from Hungtze hu to the sea, controlled by movable dams, for the discharge of flood waters, was completed in June 1937. The control of discharge at other points, the provision of additional irrigation and drainage canals, and the improvement of navigation facilities by dredging were other important items in the project. The new diversion of the Hwang ho (see p. 513) is likely to add to the difficulties of coping with the problems of regulating the Hwai ho system.

THE GRAND CANAL

By far the most important of the many canals of China is the Grand Canal, which has a length of over 1,000 miles and is the longest artificial waterway in the world. It was built in sections and enlarged from time to time as the need for a north-south waterway developed. The earliest section, from Chinkiang to Tsingkiangpu, linking up to 1938 the Hwai and Yangtze waterway systems, was completed as early as the fifth century B.C. About the year A.D. 610, during the Southern Sung period, it was extended to the south as far as Hangchow, then the Imperial capital. The northern section was constructed in the period 1280–83 by the Mongol emperor Kublai Khan, to connect Tsingkiangpu, then on the Hwang ho, with his capital, Peking. For centuries it was the chief north-south highway of China, and along it came the tribute rice from the Yangtze provinces to Peking; one of its Chinese names, Yunliang ho (grain transport river) indicates its importance in this respect. Its usefulness was seriously impaired by neglect in the nineteenth century, and this decline was accelerated by the coming of the railways which provided new routes from the North China Plain to the Yangtze valley. The Grand Canal, however, could still be a cheap and useful, if slow, alternative to the railways if extensive improvements were carried out. Such improvements were envisaged in a project sponsored by the National Economic Council in the years preceding the Sino-Japanese war, as part of larger conservancy schemes in connexion with the Hwai ho and other rivers along the Grand Canal route.

The Grand Canal, like the majority of the artificial waterways of China, also provides a system of drainage and irrigation, particularly in the low-lying parts of the North China Plain. Owing to continued silting it often runs above the level of the neighbouring lowlands. This phenomenon, though useful for irrigation, necessitates the building of embankments to prevent flooding in summer. These embankments are generally of earth and carry a tow-path on top, but in parts, especially between Chinkiang and Hangchow, extensive use has been made of stonework.

The water supply of the Grand Canal is derived from the various river systems through which the canal passes and from the lakes, which are a particular feature of Anhwei and Kiangsu. To regulate the flow of water to and from the canal considerable use is made of floodgates and movable dams constructed at intervals along the

embankments, and of locks and weirs built across the canal. These latter are considerable hindrances to navigation as boats have to be lightened and dragged over 'haulovers' at the side. It is hoped that the provision of ship-locks will obviate the necessity of these obstacles to water traffic (Plate 142).

A wide variety of craft uses the Grand Canal. Junks, sampans, and native boats of all kinds predominate, but from Tsingkiangpu to Hangchow numerous steam and motor launches, often towing cargo-boats, are met with. Goods of every description are carried, but salt, timber, grain, and other agricultural products are amongst the most important commodities.

For the purpose of a geographical description it is convenient to divide the Grand Canal into the following four sections:

(1) Peiping to the Hwang ho
(2) The Hwang ho to Tsingkiangpu
(3) Tsingkiangpu to Chinkiang
(4) Chinkiang to Hangchow

Peiping to the Hwang ho

The northernmost section of the Grand Canal from Peiping to the crossing of Hwang measures about 460 miles. This part has largely fallen into disuse owing to the excessive silting caused by the Hwang ho and other rivers, and considerable stretches may at times run completely dry. The competition of the Tientsin–Pukow railway and the sea route from Tientsin to Shanghai have so taken from its importance that remedial measures have scarcely seemed worth while, and years of neglect have allowed much of the canal to be choked by an accumulation of mud and silt.

From Peiping a short canal runs east to Tungchow, whence the Pei ho provides a channel to Tientsin (see p. 420). From Tientsin, the Yu ho or Yun ho, as it is usually called, runs south-west across the plains into the course of the Wei ho, a canalized and embanked river, to Lintsing. These two portions have depths of 4–6 ft. in winter and of 14 ft. in summer and are most useful for navigation. The waterway is generally over 200 ft. wide, but narrows to 60–120 ft. between Tehchow and Litsing, where it also is at its shallowest. In the vicinity of Tientsin there is much junk and steam launch traffic, and regular passenger and cargo services operate south as far as Hsingki. During winter, when depths are at their lowest, the canal is often ice-bound and traffic suffers accordingly.

From Litsing south-east to the Hwang ho the Grand Canal is of

minor importance. It generally lies above the low-water level of the Hwang ho and tends to run dry in winter; in summer it silts up so rapidly that the floodgates, through which water enters the canal, are usually kept closed. The passage of the Hwang ho also presents difficulties; during low river there may be insufficient water even for small craft, and during high river the current is often too strong. The new diversion of the Hwang ho southward is likely to worsen the situation by depriving a large part of this section of whatever water supply it has.

The Hwang ho to Tsingkiangpu

From the Hwang ho crossing the Grand Canal runs south-westward across western Shantung, crossing the Kiangsu border near Taierhchwang, to Tsingkiangpu, a distance of about 280 miles. Tungping hu, Weishan hu, and other lakes along this section have been used as storage basins to supply water to the canal in winter, and were equipped with floodgates to regulate the flow. These lakes have now silted up to a great extent and are no longer able adequately to fulfil their functions as reservoirs. Navigation over this section is difficult. There is considerable shallowing as a result of silting, and at some points mud and sand banks almost block the canal; furthermore, it is largely ice-bound for one or two months of winter. The canal is generally of ample width, 200–250 ft., but there are numerous obstructions to navigation in the form of locks, built to offset the changes of levels which occur from place to place. Least depths in this section vary from 2 ft. in winter to 4 ft. in summer, but parts are much deeper. The most important part of this section lies in Kiangsu, where there is a definite southerly current in the canal. In summer steam-launches, motor-boats, and sailing junks ply increasingly from Suchien to Tsingkiangpu and along other waterways running east and west from the Grand Canal.

Tsingkiangpu to Chinkiang

From Tsingkiangpu the Grand Canal runs almost due south immediately east of Paoying hu and Kaoyu hu through Yangchow (Kiangtu), to reach the Yangtze at Kwachow, almost opposite Chinkiang, a distance of about 110 miles. This section of the canal is fed by the waters of the Hwai ho system, of which it serves as the main outlet; the Hungtze hu, Kaoyu hu, and other lakes lying to the west of the canal serve as storage basins supplying the canal during winter. Here too there is much silting caused by the flood

waters of the Hwai ho, and the recent diversion of the Hwang ho southwards is bound to make the allied problems of silting and flooding even more difficult. The width of the canal varies from 150 ft. to 300 ft., and along the whole course a path runs on one or other of the embankments, and towing is always possible. The influence of the tide is felt northward as far as Yangchow, where the southward-flowing current may attain 3–4 knots. Depths over this section vary considerably; some sections have as much as 15 ft. at low water, but at Yangchow there is only 2 ft. at low water and 4–5 ft. at high water.

In spite of these difficulties the Grand Canal offers the most useful route from northern to southern Kiangsu, and is regularly used not only by innumerable junks and small native craft but by many steam launches, motor-boats, and tugs of 2–4 ft. draught, towing passenger and cargo boats.

In 1934 the National Economic Council sponsored a series of projects for the improvement of the whole southern section of the Grand Canal in conjunction with the Hwai River Commission and other conservancy bodies. By 1936 three ship-locks had been completed between Tsingkiangpu and the Yangtze to allow the passage of steamers with draughts of up to 8 ft. and with a displacement of up to 900 tons at all seasons. Extensive dredging and the construction of dykes, dams, sluices, and bridges were also undertaken and largely completed before the outbreak of hostilities in 1937 (see also p. 517).

Chinkiang to Hangchow

The southernmost section of the Grand Canal, measuring about 200 miles long, runs south-west from Chinkiang and thence south to Hangchow. There is a good supply of water derived from the Yangtze delta drainage with its many water-courses and lakes. The largest of these, Tai hu, is a storage basin of much importance. There is silting at a few points only, which can generally be skirted by the use of side canals. The canal embankments are generally well-constructed permanent masonry structures with a tow-path on top. There are also many picturesque stone bridges spanning the canal. The influence of the tide from the Yangtze is felt as far as Tanyang, south of which there is a slight current in the direction of Hangchow. The width is normally 120 ft. but may decrease to about 30 ft. at bridges. The gradient is gentle throughout, and there are no locks.

This section of the great waterway is the most useful of all, providing one of the most important means of communication in the Yangtze delta. There are average depths of 7–10 ft., but parts may have as little as 1½ ft. depth during dry winters. During high water it is generally accessible to vessels of 4½–6 ft. draught, and is in constant use by small steam launches with a maximum tonnage of 30 tons, towing up to six cargo boats. In summer there is a never-ending stream of junks and native craft and regular passenger and cargo services operate between Chinkiang, Wusih, Soochow, Kashing, Hangchow, and other points on the Grand Canal and Yangtze delta waterways system.

THE YANGTZE KIANG WATERWAYS

The Yangtze kiang, one of the four largest rivers of the world, measures about 3,200 miles from its Tibetan source to the sea. Its drainage area, which includes large areas of eleven provinces of China Proper, is estimated to cover 1·5 million square miles, a rich and fertile basin with a population of about 200,000,000.

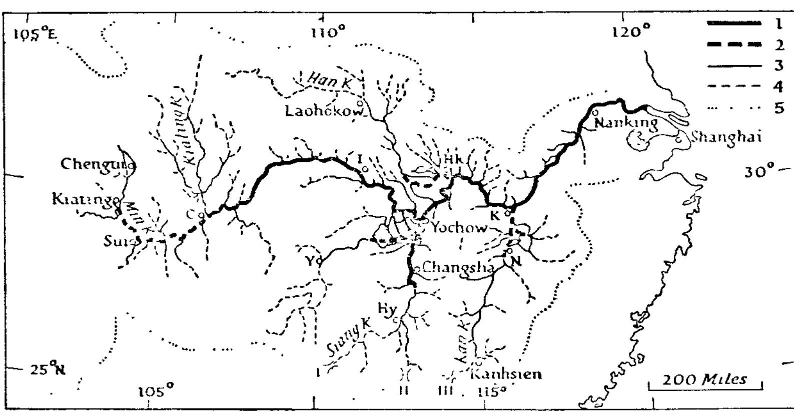

Fig. 90. The Yangtze Waterways system

Based on Spencer, J. E., 'Trade and Trans-shipment in the Yangtze Valley,' *Geographical Review*, vol. xxviii, p. 114 (New York, 1938).

1. Regularly scheduled all-year steamship runs, 2. Waters open to all-year service by steam launches and steam tugs with barges and lighters, 3. Additional waters navigable during the whole year by large native boats, 4. Additional waters navigable during the whole year by small boats and rafts, 5. Limits of the Yangtze drainage basin.

C, Chungking; Hk, Hankow; Hy, Hengyang; I, Ichang; K, Kiukiang; N, Nanchang; Y, Yuanling.

I, Kweilin pass; II, Cheling pass; III, Meiling pass.

General Features

Navigability

By way of the Yangtze steam traffic regularly travels 1,400 miles into the heart of China, and small vessels go considerably farther except at the period of lowest water. Hankow, the head of ocean-going navigation, although nearly 600 miles from the sea, can be reached by vessels of 29 ft. draught at high river and of 10 ft. draught at low river. Small native craft drawing no more than 1 ft. penetrate far beyond the range of steamer traffic, and there must be in all about 25,000 miles of Yangtze waterways ultimately navigable from Shanghai (Fig. 90).

Volume of Water

The volume of water discharged annually by the Yangtze into the East China Sea is immense, being estimated at an average of 1,050,000 cubic ft. per second. At Ichang and Hankow in the month of June, during the summer floods, the average discharges are calculated to be about 675,000 and 1,000,000 cubic ft. per second respectively; this difference is due to the influx of water from Tungting hu and the Han kiang. The load of sediment carried down by the river is over 6,000 million cubic ft. per annum, and has helped to build up the great Yangtze delta in the course of a few thousand years (see vol. i, pp. 38-9, 101-3).

Gradient

A survey of the gradients of the Yangtze from source to mouth is revealing from the point of view of navigation:

	Distance	Fall	Gradient
	miles	ft.	ft. per mile
Source–Paan (Batang)	570	8,000	14·0
Paan–Pingshan	955	7,400	7·8
Pingshan–Ichang ..	644	850	1·3
Ichang–Hankow	367	102	0·3
Hankow–Woosung ..	570	70	0·1

From the source to Pingshan the gradient is thus extremely steep and the river of a torrential nature, hence navigation is impossible. From Pingshan to Ichang there is a considerable fall, especially through the gorges, but vessels can use this section of the river

at high water with some difficulty. The remainder of the course from Ichang to the sea has a fall of less than 200 ft., and the gradient allows of navigation at all seasons of the year.

Seasonal Changes in Level

The Yangtze kiang, like the other rivers of China, is subject to periodical changes of level, which vary from an average of only 3 ft. at Woosung to as much as 70 ft. at Kweichow in the gorges, where the highest recorded rise of the river level was 275 ft. in 1871. These variations are the direct outcome of the seasonal variations in precipitation, which is at a maximum in June–July, and at a minimum in December–January (vol. i, Fig. 90). There are, however, considerable irregularities both in the amount and time of the rise and fall from year to year, as the tables on p. 525 show.

Above Ichang the Yangtze kiang is confined to a narrow valley, which for long stretches, especially in the gorges, is little wider than the river itself. Here the difference between high and low river are much greater than in the middle and lower sections of the river, where the floodwaters overflow the banks and spread over the lowlands. The wide extent of the plain of the Hupeh basin accounts for the particularly low high-river levels at Shasi, which are appreciably less than at more confined sections of the river nearer the sea. Variations are also caused by local irregularities in precipitation, and below Ichang by the influx of the major tributaries. These are of less significance as the sea is approached, but help greatly in opening up the shallow portions of the middle river and its tributaries to navigation.

The duration of the low-water season in the Yangtze is generally from December to March, with a minimum in January. From the end of March the river rapidly rises, often with considerable fluctuations, due to freshets. The high water usually lasts from June to September, attaining a maximum in early August. The fall to winter level is usually steady with few perturbations.

Tides

Of much less importance than the seasonal variations are the rise and fall of the river due to the influence of the tides. This is felt as far as Tatung, about 350 miles from the sea, but is of no importance beyond Wuhu. Approximate figures for spring and neap rises to Wuhu are as shown in the table at foot of p. 525.

Heights of High and Low Water, Yangtze kiang

Location of river-gauge	Period of observation	Low water			High water		
		Lowest	Average	Highest	Lowest	Average	Highest
		ft.	ft.	ft.	ft.	ft.	ft.
Wuhu ..	1907–37	0·0 (1923)	2·3	6·4 (1912)	19·9 (1928)	25·4	31·3 (1931)
Anking ..	1924–37	0·0 (1929)	3·2	7·8 (1936)	29·0 (1928)	36·8	43·3 (1931)
Kiukiang	1907–37	−0·5 (1929)	4·2	11·3 (1912)	32·7 (1928)	40·8	45·8 (1935)
Hankow	1870–1937	−3·2 (1901)	2·7	10·5 (1906)	31·5 (1900)	43·7	53·7 (1931)
Yochow (Chenglin)	1900–37	−1·3 (1923, 1937)	2·1	8·8 (1906)	32·0 (1900)	44·0	51·2 (1935)
Shasi ..	1900–37	−3·3 (1915)	−0·3	2·9 (1912)	21·0 (1900)	29·8	35·3 (1935)
Ichang	1904–37	−2·7 (1937)	0·3	2·4 (1906)	34·5 (1929)	43·1	51·3 (1921)
Wanhsien	1917–37	−1·4 (1937)	1·5	2·9 (1921, 1926)	80·2 (1929)	111·5	137·5 (1921)
Chungking	1893–1937	−2·4 (1937)	0·5	2·7 (1912)	50·3 (1900)	73·0	106·9 (1905)

Dates of High and Low Water, Yangtze kiang

Location of river-gauge	Low water			High water		
	Earliest	Average	Latest	Earliest	Average	Latest
Wuhu ..	5 Jan. 1925	4 Feb.	23 Mar. 1929	24 May 1925	4 Aug.	3 Nov. 1907
Anking ..	4 Jan. 1925	2 Feb.	23 Feb. 1934	23 May 1925	21 July	15 Sept. 1931
Kiukiang	10 Jan. 1925	9 Feb.	28 Mar. 1929	22 May 1925	2 Aug.	29 Oct. 1907
Hankow ..	5 Jan. 1885			23 May 1877	8 Aug.	27 Oct. 1907
Yochow ..	6 Jan. 1925	7 Feb.	27 Mar. 1929	23 June 1914	6 Aug.	25 Oct. 1907
Shasi			5 Apr. 1937	25 June 1930	3 Aug.	28 Sept. 1907
Ichang	21 Jan. 1932	25 Feb.	4 Apr. 1928, 1937	22 June 1933	6 Aug.	24 Sept. 1915
Wanhsien			3 Apr. 1937	21 June 1933	9 Aug.	20 Sept. 1929
Chungking	9 Jan. 1893	5 Mar.	13 Apr. 1907	19 June 1929	5 Aug.	7 Oct. 1894

(Source: Maritime Customs, *Report of the Marine Department*, 1937, pp. 367–70 Shanghai, 1938).

Tidal Rises, Yangtze kiang

	Spring rise	Neap rise
	ft.	ft.
Woosung ..	11¼	8¾
Chinkiang ..	3½	2¾
Nanking ..	2	1
Wuhu ..	1½	1

The tidal rise and fall is only apparent when the river level is steady. When it is rising or falling quickly the tidal effects may be completely masked and are always small at high river.

Tidal streams in the lower Yangtze are also much affected by the state of the river. At high river there is a continuous seaward flow of 4–5 knots, sometimes touching 6 knots in freshets; these rates may be slightly accelerated or retarded by the normal tidal stream. At low river the seaward flow is from $1\frac{1}{2}$–2 knots, but there may be a slight flow upstream with the incoming tide, which has been perceptible on rare occasions as far as Wuhu.

Currents

The rate of flow in the lower Yangtze to Wuhu is discussed above in connexion with tidal streams. Above Wuhu there are considerable variations depending on the state and character of the river, and occasionally on the direction of the wind. Up to Ichang the current flows generally at the rate of 1–2 knots in winter; in summer the increased volume increases the speed of the current to 4–5 knots normally, and even more in freshets. Above Ichang, where the gradient is steeper, winter rates are $1\frac{1}{2}$–3 knots, and summer rates 4–8 knots, but the abnormal conditions prevailing in rapids produce speeds of 9–13 knots.

Effects of Floods

During the high-water season floods occur annually at one part or another of the middle and lower Yangtze plains. At points the river banks become completely submerged and the river itself takes on the appearance of a great lake. Under such conditions familiar landmarks are often obliterated and vessels are in danger of getting out of the navigable channels with risk of stranding. Furthermore, the silt brought down in time of floods is not scoured sufficiently by the descending stream, whose efforts are not concentrated on a single channel. Depth in the channels may be materially altered and new shoals and banks formed.

Changes in the River

In the upper Yangtze the river bed is generally rocky, and the river may be considered stable apart from the effects of seasonal variations. From Ichang, however, to the sea, where the river flows over alluvial plains, it is constantly changing. These changes, which are not only confined to the alterations in channel depths and the formation of new shoals and banks caused by floods, and men-

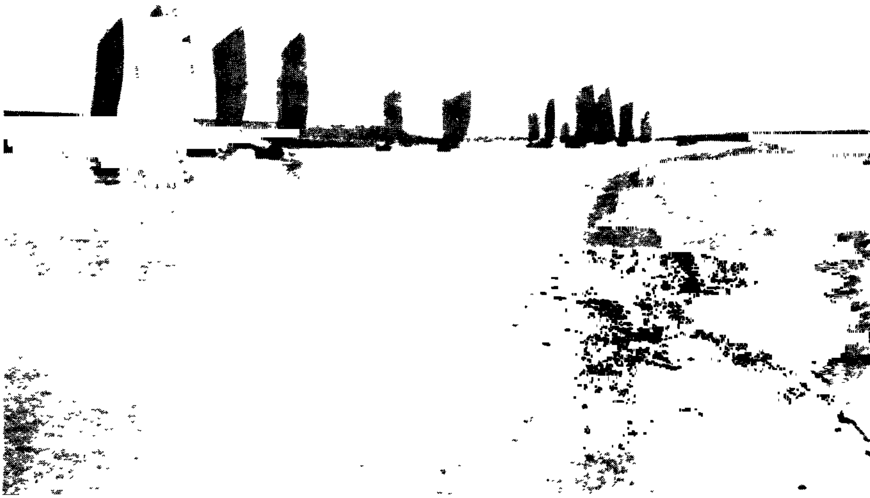

Plate 141. Junks on the Hwai ho
The Hwai ho provides the chief route for junk and barge traffic in northern Anhwei.

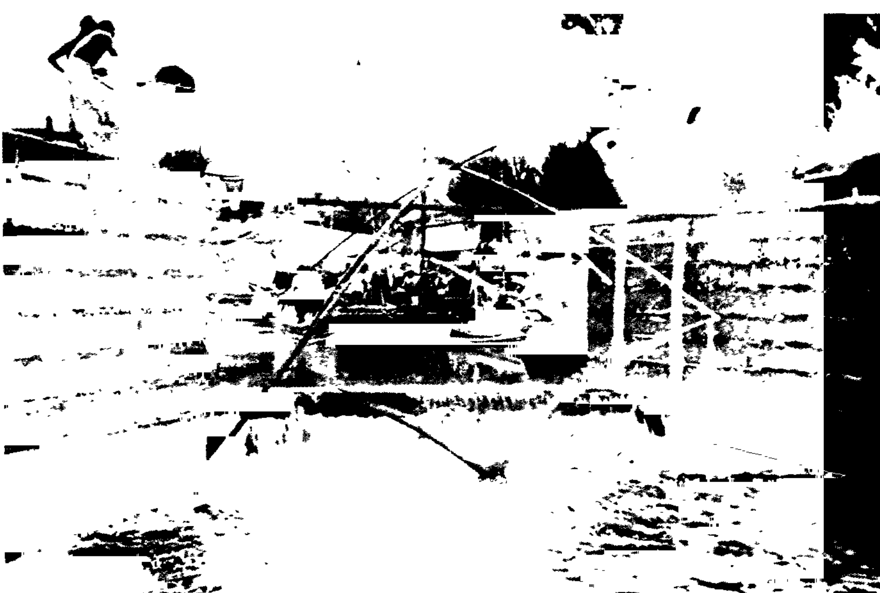

Plate 142. Lock on the Grand Canal, Kiangsu
A fisherman raises his net to enable a rice barge to make the passage of the lock.

Plate 143. Cargo boats on the Grand Canal

Plate 144. Kungling tan rapids, Yangtze kiang
River steamers are seen making their way through one of the difficult rapids in the gorges above Ichang.

tioned above, may also extend to changes in the actual course of the river. Obstructions from any cause may divert the river into one or more new channels, which are themselves unstable and liable to change from year to year. The section from Chenglin up to Sunday island in the middle Yangtze is most liable to changes of this kind. Below Hankow the river maintains the same channels for long periods, though depths may alter and new shoals and banks form.

Conservancy

The need for a conservancy authority became apparent as soon as the Yangtze became an international water highway, but it was not until 1922 that the Yangtze River Commission was formed and entrusted with conservancy matters over the whole river. The Marine Department of the Maritime Customs, the Whangpoo Conservancy Board (see p. 298), and, to a lesser extent, other conservancy bodies, have co-operated in the great problem of improving the Yangtze and its tributary systems for navigation and in controlling floods. Because of the immensity of the task the progress of the work of the Yangtze River Commission was slow ; it has made volumetric measurements of the river, built dykes and embankments to prevent destructive flooding, and has surveyed the most difficult crossings. (In many parts of the river navigation consists mainly of following either the left or right banks. The places where vessels must cross from one bank to another are termed ' crossings ' ; these are named or numbered, and the Maritime Customs issues periodical information as to their navigation.)

In 1934 the Yangtze River Commission came under the control of the National Economic Council, and new projects were put in hand which were interrupted by the outbreak of war in 1937. Since then the Commission has been concerned mainly with the improvement of the waterways of the upper river, which still remain under Chinese control, with a view to helping to ease the difficulties of communication in the large areas of ' Free China ' in the Yangtze basin. Since 1941 all the conservancy organizations in China have been amalgamated under one central authority, the National Conservancy Commission.

Administration

The administration of the navigation of the Yangtze is in the hands of the Marine Department of the Maritime Customs, which divides the river into the following administrative areas :

(1) From the sea to Vine point (about 50 miles above Woosung), administered by the Coast Inspector's office at Shanghai.

(2) Lower Yangtze river, from Vine point to Hankow, administered by the River Inspector's office at Hankow.

(3) Middle Yangtze river, from Hankow to Ichang, administered by the River Inspector's office at Yochow.

(4) Upper Yangtze river from Ichang to Chungking, administered by the River Inspector's office at Chungking.

The Marine Department issues *Notices to Mariners* dealing with the navigability of the river, attends to the buoyage and marking of channels and crossings, licences pilots on the difficult Upper Yangtze river section, and is the general administrative authority for the river ports.

Shipping

The traditional means of carrying goods on the Yangtze is by junks, sampans, and other native craft. Though the coming of the foreign type steamer and motor ship has had a serious effect on native shipping, junks still handle a very large volume of trade, particularly over the minor and more inaccessible waterways. At the great river ports junks make contact with steamers, discharge native goods, and take on other native goods and imported products to their home areas. One or two stages of trans-shipment into smaller vessels take place at key points before the furthest limits of the Yangtze system are reached. Ichang is such an important shipment point, where the large heavy junks of the middle and lower river discharge and take on goods travelling by the smaller lighter craft plying on the upper Yangtze. The types of junks used vary enormously according to the different conditions prevailing in the different parts of the river and its tributaries (see p. 583).

Foreign type vessels trading on the Yangtze have increased steadily in size. The original small steamers and paddle boats have been replaced by modern freighters. Vessels of 10,000 tons have been known to reach Hankow at high river, and vessels of over 2,000 tons regularly travel to Ichang. The difficult upper Yangtze is used in summer by steamers of up to 1,000 tons. There are innumerable steam launches and tugs towing lighters and barges, which are very useful on the tributary streams. Oil-burning ships have difficulty in obtaining supplies of fuel, and it has been found more practical to use coal-burning vessels.

Trade

Normally about five-eighths of the value of China's trade is handled by Shanghai and the Yangtze ports. In foreign trade Shanghai handles about 55 per cent., and the other ports only 5 per cent., but in domestic trade Shanghai's share is not so important, being about 37·5 per cent., while the remainder deal with 28 per cent., of which nearly half is handled at Hankow. The figures for domestic trade do not represent the full value, since a considerable amount handled by native craft does not come under customs supervision, and is thus not recorded in the trade statistics.

Lower Yangtze River. The most important section of the Yangtze is that from Shanghai to Hankow, which includes the important tributary system of the Han kiang. Nearly all the downstream trade of the Yangtze, moving to Shanghai for export, and a large percentage of the upstream trade passes along this great waterway, on which lie the two major ports of Shanghai, the entrepôt of the Yangtze valley, and Hankow. Raw materials, including iron ore, raw cotton, wood-oil, pig bristles and timber, and foodstuffs, chiefly grain, eggs, egg products and tea, constitute the greater part of the goods passing downstream. The most important upstream commodities are manufactured goods, particularly cotton yarn, cotton piece-goods, metal goods, sugar and cigarettes, and fuel, mainly coal and kerosine. There is considerable upstream movement of salt from northern Kiangsu in junks and small boats.

Middle Yangtze River. The section from Hankow to Ichang, though not as important as the lower river, owing to the smaller volume of winter shipping, is still of great significance. The Yangtze itself and its tributary systems of the Han kiang and Tungting hu offer the easiest and cheapest means of communication for bulky products to and from a rich agricultural area. Here, too, the volume of trade downstream is greater than that moving upstream, and includes many raw materials for the Wuhan industrial area ; important downstream commodities are wood-oil from Szechwan, tea from Hunan, and rice from the 'rice-bowl' of the Tungting lake-basin.

Upper Yangtze River. This section, from Ichang to Chungking, handles a considerably lower volume of trade than the Lower or Middle Yangtze river, but constitutes the chief link between the important Red Basin of Szechwan and the outside world. As elsewhere, the downstream movement is greater, mainly of raw materials from Szechwan, particularly wood-oil and pig bristles; manufactured goods predominate in upstream traffic.

Geographical Description

The Yangtze and its major tributary systems may be conveniently described under the following heads:

(1) Woosung to Vine point
(2) Vine point to Chinkiang
(3) Chinkiang to Nanking
(4) Nanking to Wuhu
(5) Wuhu to Kiukiang
(6) Kiukiang to Hankow
(7) Hankow to Yochow (Chenglin)
(8) Yochow (Chenglin) to Ichang
(9) Ichang to Chungking
(10) Chungking to Sui
(11) The Poyang hu system
(12) Han kiang
(13) The Tungting hu system
(14) Wu kiang
(15) Kialing kiang
(16) Chi kiang
(17) Kihshui kiang
(18) Lu ho
(19) Min kiang

(1) *Woosung to Vine point*

The lower estuary to Woosung bar and the Whangpoo river have already been discussed in connexion with the port of Shanghai (see p. 296). From Woosung north-west to Vine point, a distance of about 50 miles, the Yangtze is a broad stream, up to 10 miles wide, flowing through the low-lying Yangtze delta. The navigable channels, however, are much narrower, especially in the neighbourhood of Langsha flats, and are liable to constant changes. For safe navigation the latest information is necessary, but vessels of up to 30 ft. frequently use this waterway. There are a series of small canals and creeks leading from the main river to the close network of waterways in the delta both to the north and south. These are of great significance in linking up delta settlements, but the majority do not admit of draughts of more than 4–5 ft., and many are dry at low water.

(2) *Vine point to Chinkiang*

From Vine point the general direction of the Yangtze is north, west, and the south-west, past Pitman King island and Cooper bank, where the river is in an unstable condition, to the Kiangyin narrows, where the river proper may be said to begin. Here low hills come closer to the river, which diminishes to a width of about three-quarters of a mile; this width is constantly maintained from Kiangyin up to Hankow. Above the Kiangyin the river is generally stable, except at a few points, notably the channels in the vicinity of Silver island, just below Chinkiang, for which the latest information as to their condition is advisable. At low river vessels of 27 ft. draught, occasionally reduced to 24 ft. by the depths in the critical channels, reach Chinkiang; at M.H.W.S. of high river vessels of 32 ft. can get as far as the port (see p. 331), at which the seasonal rise and fall of the Yangtze is about 12 ft.

The most important of the many small creeks and canals which branch off the Yangtze are Hsiao ho and the Grand Canal, from the south bank, and Siennumiao ho and Satu creek from the north bank. Hsiao ho, which leads to a series of small winding waterways, offers a short cut across a bend of the river, and is much used by junks. The Grand Canal enters the Yangtze at Chinkiang, but can be entered by several smaller creeks farther down river (see p. 520). Siennumiao ho has depths of 6 ft. even at low river, and carries considerable junk traffic. Satu creek has connexions with Siennumiao ho, and is also of great value to junks; it has depths of 6 ft. in winter and of 12 ft. in summer.

(3) *Chinkiang to Nanking*

From Chinkiang the trend of Yangtze upstream is westward and then sharply southward to Nanking; low hills approach the river closely on the right bank. Navigation presents few difficulties, and any vessel able to reach Chinkiang can also get to Nanking (see p. 334), where the annual seasonal difference in levels averages about 18 ft. Apart from the Grand Canal, which proceeds northwards from Kwachow above Chinkiang (see p. 521) and the Wangchia ho, which is used by junks travelling north to the district centre of Liuho, there are no subsidiary waterways of importance.

(4) *Nanking to Wuhu*

Above Wuhu the Yangtze continues its southerly direction, with low hills approaching the right bank; there are numerous low islets splitting the river into two or more channels. In this section the

differences between high and low river (23 ft. at Wuhu) begin to be of more significance, and there are considerable floods from time to time, which add to the difficulties of navigation. Generally, however, depths from Nanking to Wuhu are no less than those in the Silver islands channels, and vessels of 24 ft. draught in winter and of 32 ft. draught in summer ascend to Wuhu (Fig. 91).

In this part of the river there are a number of important creeks entering the Yangtze which communicate with the many waterways in the neighbouring parts of Anhwei and Kiangsu. On the right

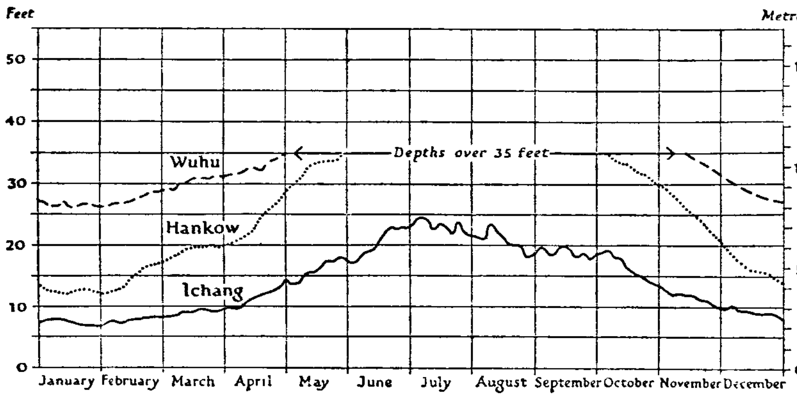

Fig. 91. Draught limits, Wuhu, Hankow, and Ichang

Based on (i) Maritime Customs, *Report of the Marine Department*, 1937, diagrams 2, 4, and 8 (Shanghai, 1938); and (ii) *Yangtze Kiang Pilot, Supplement* No. 3, facing p. 19 (London, 1938).
The period of observation for Wuhu and Hankow was 1923–37, and for Ichang 1924–37.

bank are the Taoyuan ho, which enters the Yangtze at Wuhu, and is navigable by junk and steam launch to Ningkwo, and the Taiping ho. On the left the most important stream is the Yuki ho, which leads to the Chao hu system of waterways.

(5) *Wuhu to Kiukiang*

From Wuhu to Kiukiang the direction of the river upstream is south-westerly, winding its way through a wide lake-studded plain, often by several channels. The average difference between high and low river increases, owing to the influx of water from Poyang hu, and is about $36\frac{1}{2}$ ft. at Kiukiang. Vessels proceeding to the latter port generally find the least depths in the river in the Christmas island channels above Anking. Kiukiang is normally accessible to vessels drawing 15 ft. at low river and 32 ft. at high river (see p. 345).

At Hukow, 16 miles below Kiukiang, the waters of Poyang hu enter the Yangtze, and often dam back the main stream, causing considerable silting in the Oliphant island channels just below Kiukiang. The Poyang hu system provides the main means of communication in Kiangsi (see p. 536). The Yangtze plain itself has numerous small rivers and lakes used by small craft for local traffic; of these the most important is Lungkai ho, which enters the Yangtze from the south-west at Kiukiang, and has depths of $1\frac{1}{2}$ ft. in winter and of 10 ft. in summer.

(6) *Kiukiang to Hankow*

From Kiukiang the river runs north-west to Hankow, under similar physical conditions to those prevailing between Wuhu and Kiukiang. There are a number of points at which the river is subject to changes, and the depths here usually decide the limiting draughts to Hankow, which are 10 ft. at low river and 29 ft. at high river (Fig. 91). The average difference between low and high river increases further, being 41 ft. at Hankow.

There are numerous small streams joining the Yangtze useful for the passage of small craft, and at Hankow itself is the confluence with the Han kiang, the greatest of the Yangtze tributaries.

(7) *Hankow to Yochow* (*Chenglin*)

Just below Hankow the river turns to the south-west, maintaining this direction as far as Chenglin, where the main channel from Tungting hu enters the Yangtze. Except for one large bend the course of the river is straight through a wide plain bordered by hills close to the right bank. The area is much subject to floods, and there is a continuous series of embankments. The difficulties of navigation, however, are no greater than those up to Hankow. It is impossible to give draught limits for Yochow, which are usually determined by the depths of water in the Singti channels, which may be as little as $7\frac{1}{2}$ ft. in January. The latest information is necessary for safe navigation, but vessels of 24 ft. draught have been known to reach Yochow at high level. The difference between high and low level at Yochow is 42 ft., and thus varies little from that at Hankow.

A number of rivers and canals run across the plain to the west, the most important being Pien ho, which leads to Shasi, and is much used by junks avoiding the more difficult journey up the Yangtze.

(8) *Yochow (Chenglin) to Ichang*

Above Yochow the general trend of the Yangtze is to the north-west. As far as Sunday island the river meanders in great bends through the plain, and is subject to constant changes. Above Sunday island the course of the river becomes straighter as the foot-hills of the mountains are approached; 10 miles below Ichang is the Tiger's Teeth gorge, a forerunner of the long series of gorges in the upper Yangtze. The plain is often marshy and subject to annual flooding in spite of numerous embankments. Owing to the dispersion of the flood waters, the average difference of levels at Shasi is only 30 ft., increasing to 43 ft. in the narrow valley near Ichang. The draught limits for both Shasi and Ichang are 5 ft. at low river and 14 ft. at high river, the critical channels being near Sunday island (see pp. 364, 367 and Fig. 91).

There is a dense network of waterways on both sides of the Yangtze as far as Sungtze, which give access to the Han kiang and Tungting hu systems, and carry much junk traffic.

(9) *Ichang to Chungking*

From Ichang the course of the river is westward to Wanhsien, and then south-westward to Chungking. The physical character of the Yangtze in its upper section is quite different from that below Ichang. It no longer winds through a wide alluvial plain, but is confined to a very narrow valley with mountainous land on each side. The river is tortuous and passes through a series of prominent gorges bounded by vertical cliffs, which reach a height of about 700 ft. in Wind-box gorge. The variations in the width of the stream, the uneven nature of its rocky bottom, the existence of numerous whirlpools and rapids, the strength of the current, the great variations in the seasonal rise and fall, which averages about 110 ft. at Wanhsien and 73 ft. at Chungking, and is subject to great irregularities due to sudden freshets, all serve to make navigation in the upper Yangtze a matter of extreme difficulty (Plate 144).

There had always been considerable junk traffic on the upper river plying to and from the Red Basin. This was usually limited to the few months of highest water and was attended by consider-able risk. Great numbers of native craft still travel through the gorges, and at many of the more difficult places have recourse to 'tracking,' or haulage by man-power (Plate 145). Economic pressure eventually forced trials by steam vessels, and the first steamer reached Chungking in 1895. Regular steamer services at high river during

the hours of daylight were first in operation by 1908, and by 1922–23 navigation all the year was achieved. The steamers which travel regularly on the upper Yangtze are specially constructed to deal with the hazards of the journey, and have undergone a progressive improvement in design during recent years. They are strongly built of mild steel with watertight compartments. They are generally of the light-draught twin-screw type, fitted with three rudders and both steam and hand steering gear. Short length is, however, more important than shallow draught, and a speed of 12 knots is advisable. Haulage equipment is very necessary in dealing with points of particular difficulty. A war-time development has been the provision of mechanical towing stations for hauling craft bodily upstream past dangerous points. Plans to improve the upper Yangtze for navigation have been mooted at various times since 1914. Nothing was achieved before 1933, when the Maritime Customs undertook the removal, by blasting, of the most dangerous part of the rocks at the formidable Kungling tan rapid, 33 miles above Ichang. Further work on Kungling tan was carried out in 1937, and a training wall built at the difficult Chaipantzu channel, about 40 miles below Chungking. The normal limiting draught of vessels reaching Chungking is 6 ft. at low river and 10 ft. at high river.

Except for the Wu kiang (see p. 540), the streams which enter the Yangtze between Ichang and Chungking are of little value except for very small craft for short distances.

(10) *Chungking to Sui*

Above Chungking the Yangtze again changes character, flowing from the south-west, through more open country, with rolling hills some distance from the river. Its course is winding but it is fairly wide up to Sui. There are many reefs, shingle banks, and rapids which render passage awkward. At low river navigation is particularly difficult, as the navigable channels are both narrow and shallow, and there is constant danger of grounding, but when the water level is over 20 ft. at Chungking vessels of 3 ft. draught can get to Sui with reasonable safety. The normal limit of steam navigation is Sui, but junks, in spite of the swift current, get over 50 miles past Pingshan, where the Yangtze leaves the mountains.

In this section the Yangtze receives a series of very important tributaries, which provide the chief means of communication in the Red Basin. These are the Kialing kiang, entering at Chungking; the Lu ho, entering at Luchow; and the Min kiang, entering at

Sui (see pp. 540–3). From the Kweichow plateau a number of less useful streams join the Yangtze; these include the Chi kiang and the Kihshui ho.

(11) *The Poyang hu System*

Poyang hu at its maximum during summer is a true lake, dotted with islets, measuring about 90 miles from north to south and 20 miles from east to west (Plate 146). In winter it shrinks to a vast swamp intersected by narrow channels, draining into the rivers which meander through the marshes to the common outlet at Hukow (see vol. i, pp. 99–100). Accurate observations on the rise and fall of the Poyang hu have yet to be made, hence no figures can be given of the variations in its level or its relationship with the Yangtze, for whose flood water it apparently serves as a gigantic reservoir. The difference between summer and winter level on the eastern shore is stated to be 20 ft., while rapid variations of as much as 10 ft. are experienced at Nanchang. The navigable limits for the lake channels cannot be stated with certainty, but they appear to be 3 ft. at low level and 10 ft. at high level.

Of the rivers which flow into Poyang hu by far the most important is the Kan kiang, which enters the lake at the south-east corner. The most important of the remainder are the Hsui shui (Ning kiang) from the west, the Fu shui and Kwangsin kiang from the south, and the Loan ho and the Chang kiang from the east.

Kan kiang is the most important inland waterway of Kiangsi, and with its tributaries carries a large amount of launch and junk traffic. Draught limits for the river at various stages are as follows:

	High level	Low level
	ft.	ft.
Wucheng (at the entrance to Poyang hu)	14	3
Nanchang (60 miles above Wucheng)	10	2½
Kanhsien (280 miles above Nanchang)	8	2

From Wucheng to Nanchang the Kan kiang presents few difficulties to the shallow-draught craft which use the river. Above Nanchang it is swift and shallow, with many shoals and banks, and from Kian (Plate 147) to Kanhsien, a distance of 140 miles, there are numerous rapids. The most important of the tributary streams is the Chi kiang,

which enters the main stream at Kanhsien. Small craft ascend it to Nanan, whence goods are transported by land over the Meiling pass to the upper valley of the Pei kiang (see p. 554).

Hsui shui and *Fu shui* are both of minor significance, but carry a certain amount of traffic by shallow-draught craft.

Kwangsin kiang is a more important river. Large numbers of junks and launches ply over the lower reaches, and small craft ascend to Yushan at its eastern headwaters, which is within easy reach of the Tsientang kiang system (see p. 544). Draught limits for the lower river are as follows:

	High level	Low level
	ft.	ft.
Yukiang (164 miles from Hukow)	6	$2\frac{1}{2}$
Hokow (87 miles above Yukiang)	4	$1\frac{1}{2}$

Loan ho and *Chang kiang* have a common entry into Poyang hu at Jaochow (Poyang), which is accessible to vessels drawing 8 ft. at high water and $2\frac{1}{2}$ ft. at low water. The Loan ho is of considerable value for about 40 miles upstream to Loping, for which draught limits at high water are 6 ft. and at low water $2\frac{1}{2}$ ft. The Chang kiang offers the principal means of communication to and from the famous pottery centre of Kingtechen (Fouliang), about 70 miles above Jaochow.

(12) *Han kiang*

The Han kiang, one of the greatest of the Yangtze tributaries, measures 900–1,000 miles from its source in the Tsinling shan in southern Shensi to its confluence with the Yangtze at Hankow. From Hankow to Laohokow, a distance of 300 miles, the Han kiang meanders through the wide plains of the Hupeh basin; its direction is westward for about half the distance to Shayang, and then northerly to Laohokow. Above the latter there are impressive gorges leading to the fertile Hanchung basin set in the Central Mountain Belt. At its confluence with the Yangtze the Han is only about 200 ft. wide, but broadens to about $1\frac{1}{2}$ miles above Shayang; the upper reaches especially in the gorges are much narrower. The rise and fall of the Han coincide roughly with those of the Yangtze, but are considerably less in extent; summer levels are often little above those of winter, and at Anlu the average difference is only

2–4 ft. The river is subject to pronounced irregularities in levels of up to 20 ft., which are caused by sudden freshets, and mask the seasonal changes. There is usually a small spring rise caused by the melting of snow in the Tsinling shan and Tapa shan. The Han in Hupeh often flows above the level of the plain, and disastrous floods may occur.

Launches drawing 4 ft. ascend to Shayang, which has a daily passenger launch service to Hankow. In summer launches drawing 3 ft. have got to Anlu, and native craft of $3\frac{1}{2}$ ft. draught to Laohokow. The river between Shayang and Laohokow is in an unstable state and has many sandbanks. At Laohokow goods are trans-shipped to lighter junks, drawing 1 ft. in winter and 3 ft. in summer, which often have recourse to 'tracking' (see p. 538) in their journey to Hingan, which is the limit of navigation for fair-sized junks, and to Hanchung.

There are numerous streams and canals in the Hupeh plain linking up the Han and Yangtze systems. The most important run from Shayang to Shasi, where the two rivers are only 25–30 miles apart. The route from Hankow to Shasi via the Han kiang and these canals is about 80 miles shorter than the Yangtze route, and is often used by junks avoiding the longer and more difficult route on the main river. The Han system as a whole carries a very considerable traffic, being the principal means of communication in the rich agricultural region of the Hupeh basin.

(13) *The Tungting hu System*

Tungting hu, like Poyang hu (see p. 336), varies considerably in extent and appearance from winter to summer. In winter it is a vast marsh criss-crossed by a network of small channels draining into the larger channels which carry away the waters of the rivers flowing into the lake. In summer it becomes a lake about 75 miles long by 56 miles wide, filled with the flood waters of the Yangtze and other rivers. Tungting hu has several outlets northward into the Yangtze, of which that issuing at Chenglin is the most important.

As in the case of Poyang hu, the information respecting the seasonal changes of Tungting hu is very inadequate, and the relationship between the lake and the Yangtze remains a matter of uncertainty. At high level the lake is navigable for vessels drawing up to 6 ft., but at low level navigation, if at all possible, is confined to the main channels.

The Siang kiang, which enters from the north, is the most important

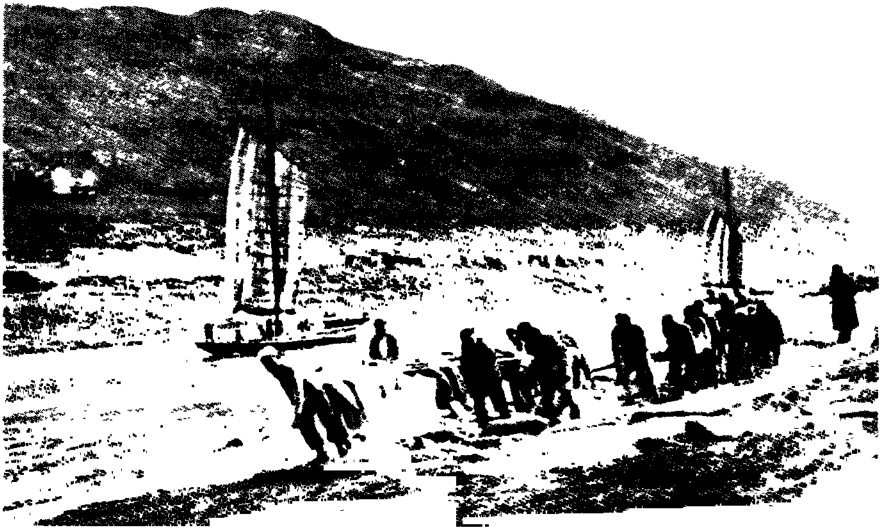

Plate 145. 'Tracking,' Yangtze gorges

'Tracking,' or haulage, by manpower has long been used to enable junks to travel upstream against the swift current of the many rapids in the gorges.

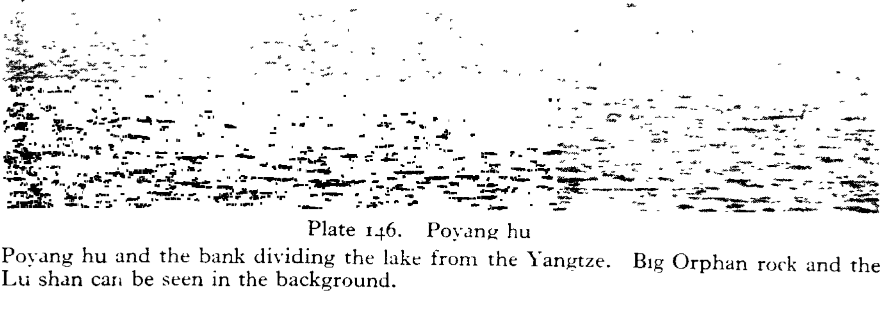

Plate 146. Poyang hu

Poyang hu and the bank dividing the lake from the Yangtze. Big Orphan rock and the Lu shan can be seen in the background.

Plate 147. The Kan kiang at Kian, Kiangsi
Kian is a river port on the Kan kiang, 140 miles above Nanchang.

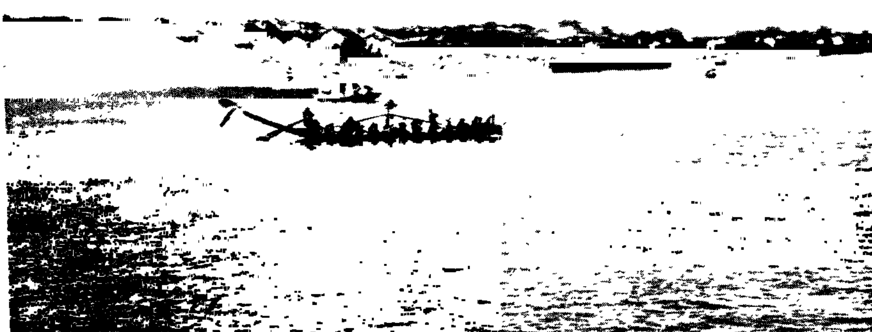

Plate 148. The Siang kiang at Siangtan, Hunan
Siangtan is the winter limit of shallow-draught steamer navigation on the Siang kiang.

river flowing into Tungting hu, but the Yuan kiang and the Tzu shui, or Tzu kiang, entering from the west, are also valuable from the navigational point of view.

Siang kiang is the chief means of communication in Hunan, and carries annually a large volume of traffic directed principally to and from Hankow, which serves as an entrepôt for the fertile Tungting lake-basin (see vol. i, pp. 97–8). From Chenglin the route to the mouth of the Siang kiang at Laishihshan is by a channel along the east side of the lake, known as East lake route. Some distance above Laishihshan the river divides, one branch leading westward via the winding Lingtzukow creek to the Tzu shui and the Yuan kiang, the other branch leading southward past Siangyin to the former treaty port of Changsha (see p. 359), 94 miles from Chenglin. At high level vessels of 8 ft. draught and at low level vessels of 4 ft. draught can reach Changsha, where the average difference between high and low river is about 18 ft.

From Changsha to Hengyang (Hengchow) the Siang kiang is subject to rapid fluctuations in level and is shallow enough in parts to hinder navigation. At low level, however, shallow-draught steamers reach Siangtan, 30 miles south of Changsha (Plate 148), and at high level as far as Hengyang, 133 miles more upstream, which is also the limit of junk navigation at low level. Above Hengyang the river continues south to Sungpai and then south-west to its headquarters; this upper section of the Siang kiang is obstructed by many rapids over gravel bars, at which boats may have to be unloaded and hauled across when the water is low. Junks and launches at high river get to Lingling, 166 miles above Hengyang, while small craft can with difficulty travel past Chuanhsien to Kwelin and the upper waters of the Kwei kiang by a canal (Plate 159). Another difficult route south is by a tributary, the Lei shui, from Hengyang at the confluence south of the Cheling pass and the headwaters of the Pei kiang (see p. 554).

Yuan kiang has long provided a trade route from Hunan to Kweichow and Szechwan, utilizing also the Wu kiang (see p. 540). From Chenglin there are two routes to the mouth of the Yuan kiang at Tangan island, one across Tungting hu by the channel known as the West lake route; the other, more circuitous, by the Siang kiang, Lingtzukow creek, and the lower Tzu shui. At high level vessels of 6 ft. draught ascend 60 miles to Changteh (Plate 149), but at low level draught is limited to 2 ft. Junks and launches get to Taoyuan, 12 miles above Changteh. Beyond Taoyuan the river is

obstructed by rapids, but small craft ascend to Lungtan, on the Yu shui, which joins the Yuan kiang at Yuanling (Shenchow). Since the outbreak of war in 1937 the Ministry of Economic Affairs has put in operation plans for dredging the Yuan kiang system and otherwise improving navigational facilities, particularly in the establishment of towing stations to permit launches and large junks to get within easy reach of the Wu kiang and the Hunan-Kweichow highway.

Tzu shui (or Tzu kiang) may be reached from Chenglin either by the West lake route or by the Siang kiang and Lingtzukow creek. Steamers regularly visit Yuankiang at the river mouth, and launches to Iyang, 20 miles upstream; above Iyang there are rapids, but small craft go up river to Paoking (Plate 150), and much timber is floated down to Tungting hu.

Numerous waterways link Tungting hu with the Yangtze across the plains between and are used extensively by junks and launches plying between Shasi, Yochow, and the lake. Ochih ho runs for 60 miles north-west from the neighbourhood of Tangan island to the Yangtze at Ochihkow. Ansiang ho runs parallel to Ochih ho to the west, and also leads to the Yangtze at Ochihkow past the river port of Ansiang. Cross creeks run west from Ansiang ho to another parallel stream, Ling kiang, which leads to the small river port of Tingshih, and links up with Taiping ho and Sungtze ho, which join the Yangtze above Shasi and at Sungtze respectively.

(14) *Wu kiang*

The Wu (Kungtan) kiang rises in the Kweichow plateau and flows in a great bend northwards to join the Yangtze at Fowling, 65 miles below Chungking. It is a swift stream obstructed by numerous rapids, of which the Kung tan is the most difficult. A large number of specially adapted junks, carrying commodities to and from Kweichow and Szechwan, navigate the Wu kiang for a distance of about 200 miles. In 1939 work to improve the river was begun by blasting rocks, dredging channels through sandbars, and establishing towing stations. The Wu kiang is now reported navigable by small steamers along certain portions, and by large junks to some distance.

(15) *Kialing kiang*

The Kialing kiang rises in the Tsinling shan in southern Shensi and flows almost due south to join the Yangtze at Chungking. Two

important tributaries join the Kialing kiang at Hochow, 52 miles north of Chungking, the Suining ho (Fou kiang) from the north-west and the Hou ho from the north-east. All these rivers bring a great volume of water to the Yangtze; in winter they are low, and are characterized by two rises, a spring rise in April due to the melting of snow in the mountains and the normal summer rise in June. The average difference of level is about 5 ft., but freshets, which are particularly frequent in August, may cause a sudden rise of up to 20 ft. In winter the Kialing kiang system comprises a series of deep reaches separated by shallow rock or shingle bars, over which the water runs rapidly to form races, impeding junk navigation and rendering steamer passage impracticable.

River steamers and junks ascend regularly to Hochow, which has a daily service of small motor vessels with Chungking. On the Suining ho junks of 3 ft. draught in summer and of $1\frac{3}{4}$ ft. draught in winter get to Santai (Tungchwan). Cargo is often trans-shipped to smaller craft at Taihochen, below Santai, and it is said craft of 1 ft. draught can ascend above Santai to Mienyang, an important road junction (Fig. 83). On the Kialing kiang cargo junks with 3 ft. draught in summer and $1\frac{3}{4}$ ft. draught in winter ascend normally to Nanchung (Shunking) and occasionally in summer to Lanchung (Paoning); small craft are reported to travel as far north as Shensi border. On the Hou ho, similar junks normally reach Sanhwei and frequently in summer to Tahsien.

The Kialing kiang system is of great value as a means of moving commodities in eastern Szechwan. Since 1937 much dredging of the channels and dynamiting of rock obstructions has been carried out, and as many as 25 mechanical towing stations established. As a result navigational facilities have been improved and the increased strain on roads partially eased.

(16) *Chi kiang*

The Chi kiang enters the Yangtze about 25 miles above Chungking, flowing northwards from the Kweichow plateau. It passes through a district rich in mineral resources, especially in iron ore, and plans were begun in 1939 to improve its navigational facilities. Owing to the steep gradient and the obstructions caused by numerous rapids, junks with difficulty negotiate about 60 miles of the Chi kiang, but by the building of dams and locks it is hoped to permit large boats to travel in comparative safety.

(17) *Kihshui ho*

The Kihshui ho, which enters the Yangtze at Hokiang, about half-way between Chungking and Sui, provides an important highway of communication between the Kweichow plateau and Szechwan. The river has a meandering course, with steep-to banks, north-west from its headwaters. During low river the Kihshui is obstructed by rocks and shingle banks, and it is difficult even for small craft to get past the rapids and shallows. At high river steamers can get about 50 miles upsteam, but specially constructed junks go over 20 miles farther past a very dangerous rapid, Ping tan, where all ships unload cargo. Efforts are being made through the construction of dams and locks to improve the navigational facilities of the Kihshui ho.

(18) *Lu ho*

The Lu ho rises in the Min shan and flows south-east to join the Yangtze at Luchow, about 90 miles below Sui. The river flows in a narrow valley with few tributaries and brings little water to the Yangtze. There are higher rises in autumn than in summer, owing to rains and snowfalls at the headwaters. The autumn rise in level varies from $4\frac{1}{2}$ ft. at Kienyang to 16 ft. at Fushun.

At low river, in spite of difficulties, junks drawing 2 ft. ascend 62 miles above Luchow to Fushun, junks drawing $1\frac{1}{2}$ ft. a further 50 miles or so to Neikiang, and small craft get beyond Kienyang, 225 miles from Luchow; the upper Lu ho is connected by canal to the Min kiang and the Chêngtu Plain, but only very small craft can reach Chêngtu by this route.

The economic significance of the Lu ho lies in the fact that it is the principal means of communication for the important salt-producing district of Tzeliutsing. The increased demand on Szechwan salt since the occupation of the coastal salt-producing regions by the Japanese has led to projects for improving the Lu ho for navigation, and thus facilitating the transport; surveys have been made and improvement work was to begin in 1940.

(19) *Min kiang*

The Min kiang, which the Chinese regard as the true upper course of the Yangtze kiang, rises in north-western Szechwan, and flows south to enter the Yangtze at Sui. At Kiating it is joined from the west by two tributaries, the Tung ho and a smaller stream, the Ta ho,

from western Szechwan. All three, rising in lofty snow-capped mountains, experience a spring rise in April with the melting of the snows and the usual rise after the summer rains in June. There are numerous spates and freshets in late summer causing sudden fluctuations in the water level and sharp increases in the rate of the stream. The average differences between high and low level are 60 ft. at Sui, 22 ft. at Kiating, and 4–5 ft. at Kiangkow.

The Min kiang is easily navigable from Sui to Kiating, 86 miles upstream, at all periods except during severe freshets. During high-water season there is a regular service of small steamers of up to 368 tons net between Kiating and Chungking via Sui.

Above Kiating large junks and shallow-draught steamers can get all the year as far as Kiangkow, about 50 miles from Kiating. At Kiangkow, where the river splits into two main branches, flowing over the fertile Chêngtu Plain, the larger junks trans-ship their cargoes into sampans or 'wupans,' flat-bottomed boats drawing up to 2 ft. These craft travel over the waterways of the plain and can reach the walls of Chêngtu, which is about 150 miles from Sui.

THE SOUTH CHINA WATERWAYS

Apart from the Si kiang system, which ranks second only to the great Yangtze system as a means of communication, the most useful waterways of South China are provided by the rivers of the south-east, flowing into the East and South China seas between the Yangtze delta and the Canton delta. These, which include the Tsientang kiang, the Yung kiang, the Ou kiang, the Min kiang, the Kiulung kiang, and the Han kiang, drain the Hangchow Basin and the South-eastern Uplands and are generally characterized by a trellis drainage pattern (see vol. i, pp. 41–2). In their short lower courses they flow through narrow valleys much obstructed by rapids and are difficult to navigate, but their upper valleys and longitudinal tributaries are frequently navigable for long distances.

There are also in western Kwangtung, between the Canton delta and the French Indo-China frontier, another group of less significant streams which have some local value. These rise in the hills south of the Si kiang basin and flow southwards into the South China sea and the Gulf of Tongking.

The South China waterways may thus be conveniently described under the following heads :

(*a*) The Tsientang kiang
(*b*) The Yung kiang
(*c*) The Ou kiang
(*d*) The Min kiang
(*e*) The Kiulung kiang
(*f*) The Han kiang
(*g*) The rivers of western Kwangtung

(*a*) *Tsientang kiang*

Hangchow wan is dangerously shallow and the Tsientang bore makes navigation up to Hangchow impossible for large vessels. The Tsientang is accordingly of little value in providing a route from the sea inland into the important Hangchow Basin (see vol. i, p. 108), as only small junks of less than 3 ft. draught can get to Hangchow (Plate 151). Upstream from Hangchow, however, there is considerable traffic along the main stream and its tributaries. Steam launches of light draught run regularly to Tunglu, about 65 miles south-west of Hangchow, and junks of up to 3 ft. draught can reach Chüchow, over 100 miles farther up river in the summer. During the high-water season also small craft ply over the tributary streams, which provide the chief means of communication over much of the Hangchow Basin, and along the upper reaches almost to the Kiangsi border.

(*b*) *Yung kiang*

Vessels of up to 20 ft. draught can, at spring tides, proceed up the Yung kiang to Ningpo (see p. 287). Here the river divides into the Fenghwa and Yuyao branches. The Fenghwa branch, a narrow stream, is navigable for steam launches for about 30 miles. The Yuyao branch is also navigable to steam launches for a similar distance to Yuyao. On both these sections, which are tidal, there are depths of 5 ft. at L.W.O.S.T. and of 11 ft. at H.W.O.S.T. On the coastal plain around Ningpo there is a useful series of tidal creeks and canals with depths of 2–4 ft. at L.W.O.S.T. and of 9–10 ft. at H.W.O.S.T. One of the most important of these leads westwards from Yuyao to Shaohsing and thence into a further series of canals on the south shore of Hangchow wan. These canals are much used by junk traffic in spite of delays caused by dams, across which craft must be hauled.

(*c*) *Ou kiang*

The Ou kiang is navigable for vessels of 18 ft. draught at spring tides as far as Wenchow (see p. 284). Above Wenchow the Ou kiang is obstructed by numerous rapids, but junks travel regularly as far as Lishui and small boats ascend farther upstream. The Wenchow district around the lower Ou kiang is intersected by many tidal creeks and canals, of which the most important runs south for 23 miles to Juian. Many are inaccessible except at high tide, but the larger can be used by vessels of $1\frac{1}{2}$–3 ft. at L.W.O.S.T. and carry regular services of launch-towed passenger and cargo boats.

(*d*) *Min kiang*

Vessels of 24 ft. draught can proceed up the Min kiang to Mawei (Pagoda) anchorage, where ocean-going vessels usually anchor (see p. 277). Between Mawei and Nantai (Foochow) the river has a shifting course dangerous to navigation. The Min River Conservancy Board has carried out extensive conservancy operations, and vessels of 18 ft. draught at high-water springs can now get to Nantai (see p. 278). From Nantai up to Shuikow, a distance of about 50 miles, there is usually sufficient water at all seasons for fair-sized junks. Between Shuikow and Yenping the river is obstructed by shoals and rapids and is difficult to navigate. In the vicinity of Yenping (Nanping) the Min kiang is joined by two useful tributaries: the Ninghwa (Sha) ki, which is navigable by small craft south-west as far as Yungan, and the Shaowu ki, which is navigable for vessels drawing 2 ft. north-west to Kwangtse (Plate 152) and along its tributary, the Kin ki, almost to the Kiangsi border. The most important route, however, utilizes the Kien ki, which is generally regarded as the true upper course of the Min. Large junks travel as far as Kienow and small craft in spite of rapids ascend along its headwaters nearly to the Kiangsi boundary. There are useful tidal waterways in the vicinity of the Min estuary. At Mawei there is a tidal channel running west leading to the Tachang ki; shallow draught motor-boats travel to a point about 20 miles' distance along this route, and junks are hauled over rapids here and proceed over 50 miles farther beyond Yungtai.

(*e*) *Kiulung kiang*

Though Amoy (see p. 271) is an important centre of water traffic, the majority of this is by sea to the bays and islets nearby. There are, however, tidal creeks and canals of some importance for local

use by launches and small craft, but the Kiulung kiang is too swift and dangerous a stream to be of great value. Launches drawing $6\frac{1}{2}$ ft. run regularly up the estuary to Shihma, and junks ascend to Changchow (Lungki) up the Lung kiang, a tributary of the main streams.

(*f*) *Han kiang*

The delta of the Han kiang, at the southern side of which is the treaty port of Swatow, is traversed by an intricate pattern of creeks and channels. The great majority of these are, however, suitable only for small native craft. The most important delta channel, about 20 miles long, leads north-west to Chaochow (Chaoan), but is navigable by flat-bottomed junks of only 1 ft. draught. Above Chaochow the gradient of the river is steeper, but small junks ascend to the Kwangtung–Fukien border; here there are a series of rapids, but small boats go as far as Changting (Tingchow). A tributary enters the Han kiang from the south-west at Samhopa; this stream has a depth of $4\frac{1}{2}$ ft. to Meihsien (Kaying), above which it is shallow and obstructed by rapids, but carries a considerable amount of shallow-draught junk traffic. The Kityang kiang, which enters the Han delta west of Swatow, provides a channel of 6 ft. least depth for 25 miles as far as Kityang, used regularly by steam launches and large junks. Beyond Kityang depths diminish to only 2 ft. in the low-water season of winter, but shallow-draught boats travel as far as Hoppo. Tathoupo creek runs south-east from the vicinity of Kakchio to Tathoupo; this waterway, about 10 miles long, is narrow and tortuous, shoaling to 1 ft. depth at low water in places, but is much used by small junks taking a short cut from the sea to Swatow.

(*g*) *The Rivers of Western Kwangtung*

The area of western Kwangtung is inadequately surveyed and full and accurate information is not always available, but the most important rivers appear to be the following:

(i) West of the Canton delta is the Makyeung ho (Yang kiang), which rises near Loting and flows south into Deep bay half-way between Macao and Kwangchow wan. Junks travel 3 miles upstream to the small port of Yeungkong, and the upper river is used by small craft.

(ii) Another group of streams rise in the hills east of Watlam and enters the sea just east of Kwangchow wan. The lower part

Plate 149. The Yuan kiang at Changteh, Hunan
River craft at the waterfront of the river port of Changteh.

Plate 150. The Tzu shui at Paoking, Hunan
Timber in the Tzu shui at the small river port of Paoking.

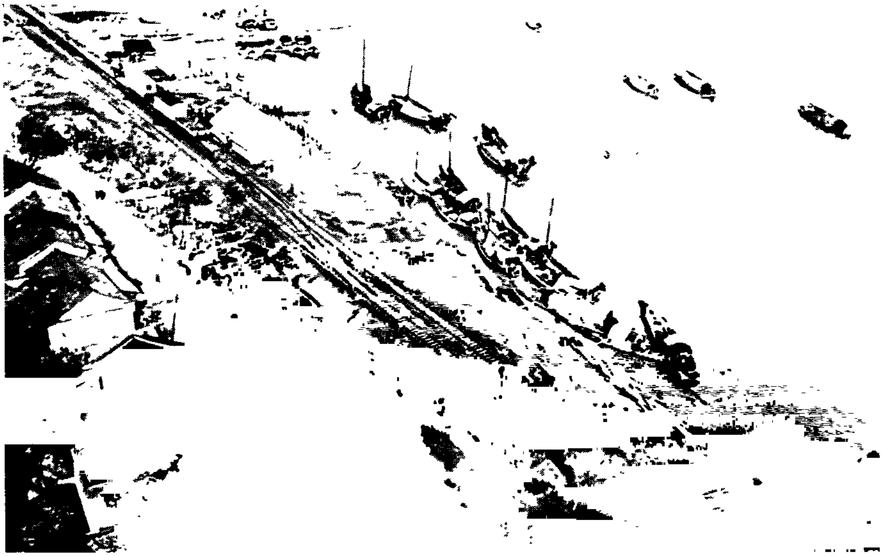

Plate 151. The Tsientang kiang at Hangchow

Small craft only can ascend to Hangchow from the sea. The Shanghai–Hangchow–Ningpo railway terminus is shown here, before the building of the Tsientang bridge (see Plate 132).

Plate 152. The Shaowu ki near Shaowu, Fukien

The Shaowu ki, one of the chief tributaries of the Min kiang, carries considerable shallow-draught traffic.

of the system below Mowming (Kochow) is known as the Kam kiang, which is a shallow stream, except after rains, and is much encumbered by sandbanks and islets. Junks of 4 ft. draught travel up the estuary for 10 miles, while boats of $1\frac{1}{2}$–2 ft. draught ply between Mowming, Fahsien, and Muiluk.

(iii) The rivers of the Luichow peninsula are small, but the Luichow river (Namtou kiang), although its mouth is beset with shoals, offers a channel of 14 ft. draught for a distance of 14 miles, and small steamers and junks, with local knowledge, proceed to the small port of Luichow (Hoihong).

(iv) The Kap shiu, rising in Kwangsi, south of Watlam, and flowing into the north-east corner of the Gulf of Tongking near Onpo, is used by vessels of $1\frac{1}{2}$ ft. draught in winter and of 3 ft. in summer for a distance of about 60 miles.

(v) The Locheng kiang (Yuling ho) also rises near Watlam and flows south-west to enter the Gulf of Tongking near Pakhoi. Junks and launches of up to 4 ft. draught can proceed 6 miles to Limchow at high water. Above Limchow rapids are encountered, but the river is navigable for small junks, drawing $1\frac{1}{2}$ ft. for a distance of about 40 miles to the Kwangsi border.

(vi) A group of streams rising south of Nanning flow south to enter the estuary of Lungmen chiang. There is a bar of 12 ft. least depth at the estuary entrance, and vessels of 7 ft. draught proceed up a deep channel to Shacheng, where cargo and passengers are transferred to shallow-draught junks, which proceed to Yamchow, and 22 miles beyond Yamchow to Lukok.

(vii) In the island of Hainan the most important inland waterways are the Pochin river, which is navigable by shallow-draught junks from its delta near Hoihow (see p. 237) to Chengmai, and the Kachek river, navigable for similar vessels from the east coast at Lokwei inland as far as Tinfou.

THE SI KIANG WATERWAYS

From the source of the Hungshui kiang, near Kutsing in Yunnan, to the sea the length of the Si kiang has been variously estimated at between 1,200 and 1,300 miles. Together with its tributaries it drains a vast area in Kwangtung, Kwangsi, Kweichow, and Yunnan, amounting to about 150,000 square miles. Though not comparable in size or importance to the Yangtze, the Si kiang provides a waterways system of great significance to South China.

General Features

Over the greater part of the system above the Canton delta plain the Si kiang and its tributaries flow in narrow valleys frequently through gorges, and are obstructed at many points by shallows and rapids. The hazards of navigation are further increased by the seasonal variations in depth to which the Si kiang, like the Yangtze, is subject. Fig. 92 indicates the average water levels through the year at Samshui, Wuchow, and Nanning, but there have been wide (and rapid) variations from the average, as the following table shows:

Heights of Seasonal Rise and Fall, Si kiang

Location of river-gauge	Low water			High water		
	Lowest	Average	Highest	Lowest	Average	Highest
	ft.	ft.	ft.	ft.	ft.	ft.
Samshui	− 3·2	− 2·4	− 1·5	17·4	22·8	26·1
Wuchow	− 1·2	0·9	2·8	47·0	59·8	73·8
Nanning	− 0·4	0·2	0·9	21·2	42·8	53·2

Source: The Maritime Customs, *Report of the Marine Department*, 1937, p. 366 (Shanghai, 1938).

The period of observation for Samshui and Wuchow was 1922–37, and for Nanning 1920–25 and 1932–37.

The low-river period extends from early December to mid-March, after which there is a rapid though irregular rise. The maximum usually occurs in July, and after the end of September there is a gradual fall again to the winter level. The changes in river levels due to the influence of the tide, felt for about 200 miles upstream, are of minor importance and at Wuchow do not exceed 1–1½ ft. In winter the current generally runs at 1–2 knots, but at high river normal rates vary from 5 to 8 knots; the current is naturally swift in narrows and rapids.

Wuchow stands at the head of navigation for ocean-going vessels on the Si kiang, occupying much the same position as Hankow on the Yangtze. It can be reached by ships of 6–7 ft. draught at low river, and of 13 ft. draught at high river, when the average draught of vessels using the port is about 4 ft. Above Wuchow and over the tributary streams of the system navigation is confined mainly

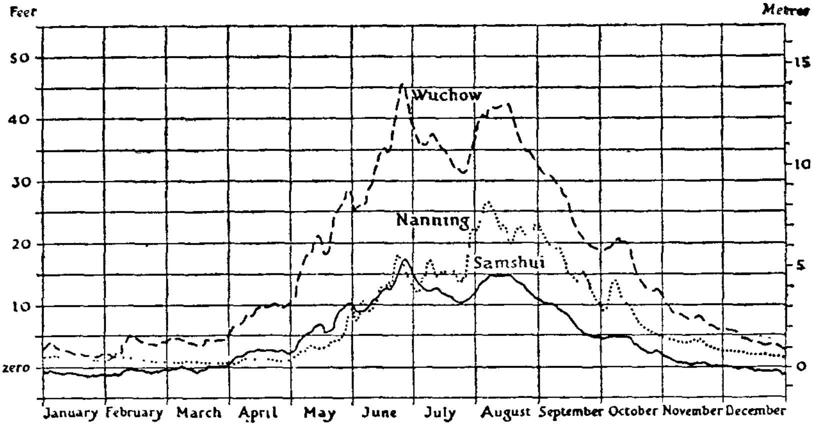

Fig. 92. Average daily watermarks, Samshui, Wuchow, and Nanning
Based on Maritime Customs, *Report of the Marine Department*, diagram No. 1 (Shanghai, 1938).
The period of observation for Samshui and Wuchow was 1922–37, and for Nanning 1920–25 and 1932–37.

to junks, shallow-draught steam launches, and smaller craft. The following table summarizes the navigability of the Si kiang and its tributaries:

Navigability, Si kiang System

River	Vessels drawing 15 ft.	Vessels drawing 6 ft.	Motor launches
	miles	miles	miles
Si kiang ..	230 (high-water season)	230 (all seasons)	700
Pei kiang ..	60 (two months)	60 (seven months)	93
Tung kiang	..	68 (two or three months)	124
Kwei kiang	..	..	200
Chu kiang	87	..	..

Source: Cressey, G. B., *China's Geographic Foundations*, p. 359 (New York, 1934).

In 1938 the National Economic Council planned to improve the Si kiang as a means of communication between Kwangtung, Kwangsi, and French Indo-China by rock-blasting, dredging, construction of dams and ship-locks, and the installation of navigational aids. Preliminary surveys were made, but since the shift of hostilities to Kwangtung and Kwangsi the work planned has been in abeyance.

Geographical Description

As well as the Si kiang itself and its tributaries, the Pei kiang, the Kwei kiang, the Hungshui kiang (including the Liu kiang), the Yu kiang, and the Tso kiang, which together form the upper reaches of the river, there are three important streams flowing into the Si kiang delta, the Tam kong, the Chu kiang, and the Tung kiang, which though independent of the Si kiang may be considered as part of the general Si kiang waterway system, which is described under the following heads:

(1) The Canton Delta waterways
(2) Samshui to Wuchow
(3) Wuchow to Sunchow
(4) Sünchow to Nanning
(5) Nanning to Poseh
(6) Tam kong
(7) Chu kiang
(8) Tung kiang
(9) Pei kiang
(10) Kwei kiang
(11) Hungshui kiang
(12) Tso kiang

(1) *The Canton Delta Waterways*

The Canton delta, like the greater Yangtze delta, is criss-crossed by innumerable canals and creeks, which are the chief, and in parts the only, means of communication. These are often enclosed by embankments to prevent flooding in summer. The smaller canals are used mainly at high tide, by sampans and small craft of not more than 1 ft. draught. The larger canals, the main highways of traffic, are used by steam launches, which are often seen towing junks of $2\frac{1}{2}$ ft. draught. The most important channel is that running from Samshui to the Wang mun entrance, almost bisecting the delta laterally. This communicates with Hamilton creek, leading to Canton, and all the other important waterways north and south of Wang mun, and may be regarded as the backbone of the delta system. Other important channels are the Chu kiang, skirting the north and east sides of the delta, the most significant channel for sea-going vessels proceeding to Whampoa and Canton (see p. 255),

and the channel formed by Wang mun, Siulam channel, and Junction channel, running across the delta and much used by river steamers travelling from Hong Kong up the Si kiang. The direct steamer route from the sea and Macao to Samshui (see p. 247) is by the Broadway, Moto mun, and the main stream of the Si kiang, which allows a draught of 8 ft. Further useful entrances from the sea into the delta west of Moto mun are provided by Neiwan mun, Futui mun, and Yai men (see p. 249). Many of the delta waterways are dry and unnavigable in winter, others allow a 2 ft. draught; in summer vessels of 6 ft. draught can use most of the system with reasonable safety (Plate 153).

(2) *Samshui to Wuchow*

From Samshui to Wuchow, a distance of about 120 miles, the Si kiang is generally a wide stream, but there are several narrow gorge-like sections (Plate 154). Navigation is not very difficult, and the river carries much steam and junk traffic, especially at high river.

From Samshui the Si kiang extends due west for 7 miles to First bar, which has a depth of 6 ft. over it at low water. Past First bar the river turns south through a gorge to reach Shiuhing, where there is a tidal rise and fall of 3 ft. at low river. From Shiuhing the river pursues a winding course westward for about 70 miles through hilly country with several small gorge stretches to Dosing (Plate 155), where it turns north. About 5 miles above Dosing is Second bar, which also has a least depth of 6 ft. The Ho kiang, a swift stream much impeded by rapids, enters the Si kiang about 10 miles north of Second bar. This river is navigable at high river to vessels of 5 ft. draught for about 90 miles, almost to the Hunan border. From the confluence with the Ho kiang to Wuchow the trend of the Si kiang is westward. Between Dosing and Wuchow there are several rocky patches dangerous to shipping at low water and usually marked by buoys. Wuchow, where the Kwei kiang (Cassia river) enters the Si kiang from the north, is accessible to vessels of 13 ft. draught at high river and to vessels of 6–7 ft. draught at low river (see p. 244).

(3) *Wuchow to Sunchow*

From Wuchow to Sünchow, a distance of about 100 miles, the Si kiang runs through hilly country between high banks. Though generally wide, the river is often difficult to navigate without local knowledge owing to the swift current and the prevalence of rocks, rapids, and sandbanks. These hazards are rendered more dangerous

by the variation in river levels, but vessels of shallow draught constantly make the journey with safety. There is a constant stream of heavy junks and launches making their way to Nanning, mostly at high river. When the wind is down river the junks are often hauled upstream by man-power. At Sünchow the Hungshui kiang, the greatest of the Si kiang tributaries, enters the main river from the north-west.

(4) *Sünchow to Nanning*

Above Sünchow, the Yu kiang, which is the name generally given to this upper part of the Si kiang, has a winding course south and south-west to Nanning, a distance of about 220 miles. Up to Kweihsien, 59 miles above Sünchow, the river runs between high banks through rolling hills, and the channel does not present great difficulties. Kweihsien can be reached by vessels of 5 ft. draught at all times, and is regarded as the limit of low-water navigation except for small boats. Above Kweihsien the country becomes more mountainous, there are numerous rapids, and the current flows swiftly. The most difficult of these rapids is the Great rapid, 28 miles above Kweihsien, which is dangerous at all times and impassable except at high river for vessels of over $2\frac{1}{2}$ ft. draught; it is, however, often passed in summer by heavily laden junks. Above the Great rapid the river, though often narrow, tortuous, and obstructed by rocks and rapids, is much used by small stern wheel steamers, launches, and junks of 2–4 ft. draught, according to the season of the year, to Nanning (see p. 242).

(5) *Nanning to Poseh*

About 30 miles above Nanning, the Yu kiang is joined from the west by the Tso (Li) kiang. The trend of the Yu kiang is north-west to the Yunnan boundary. The river flows through mountainous country between high rocky banks. The stream is narrow and swift and subject to sudden rises after rains. There are many rapids and gorges and numerous awkward bends and passages must be negotiated. At low river depths do not exceed 3 ft. in many places, but junks travel upstream at high river to Poseh, the head of navigation, about 260 miles above Nanning. Beyond Poseh the river is very difficult, but is used to some extent by sampans and small craft.

(6) *Tam kong*

The Tam kong (South-west river) rising in the hills between Yeungkong and the Si kiang, flows west to enter the Canton delta at

Sunwui. From seaward the approach to the Tam kong entrance is by Yai men, a channel allowing the passage of vessels of 8 ft. draught, which extends northward for a distance of 18 miles to the entrance of Kongmoon creek (see p. 249). At low water vessels of 7 ft. draught can proceed 27 miles westward from the northern end of Yai men to Suncheong. Above Suncheong the Tam kong is shallow and obstructed by rocks and bars, but small craft of 1 ft. draught reach Yanping. The river runs through a prosperous and fertile countryside and carries at all times a large amount of junk and sampan traffic; fishing stakes are common above Yai men and must be negotiated with care.

(7) *Chu kiang*

The lower course of the Chu kiang to Canton has already been described (see p. 255). The upper course is formed by two small streams, the Pakmai and Tsungfa rivers, which unite about 11 miles north of Canton and enter Canton harbour by Starling reach. Neither is of much importance as a waterway, but launches and passenger boats travel regularly to Shekmun, 8 miles from Canton, and small craft ascend to Pakmai and Tsungfa. An important branch waterway is Lupao creek, which runs south-west into the Pei kiang.

(8) *Tung kiang*

The Tung kiang (East river), which is about 290 miles long, rises in the hills of south-east Kiangsi and flows southward through Kwangtung to Waichow. From here it turns west past Sheklung, through a large delta, which is considered as a part of the larger Canton delta and enters the Chu kiang from the east through a number of channels. Escape creek is the most useful of these, which are much obstructed by shoals, bars, and banks. Vessels of 8 ft. draught can travel 5 miles up Escape creek, and there is a regular launch and passenger boat service at high water to Sheklung, to which there is, however, a least depth of only 2 ft. The upper Tung kiang, though broad, is shallow, and its navigability is much affected by the swift current, by sandbanks, and by the variations of 3–5 ft. in its level. From Sheklung to Waichow launches of $3\frac{1}{2}$–4 ft. draught ply at all seasons, and in summer can reach Hoyun, 78 miles farther upstream. Light junks of 3 ft. draught get to Lungchuan and sampans to the Kiangsi border. Tributary streams enter the Tung kiang at Sheklung and Waichow and are used by light junks north to Lungmen and south-east to Tamshui and Samto.

(9) *Pei kiang*

The Pei kiang is formed by two streams, which rise in the Nanling and unite at Shiuchow, whence the river flows south to enter the Canton delta at the former treaty port of Samshui (see p. 247). The Pei kiang is about 280 miles long and, like the other rivers of the Si kiang system, is subject to seasonal variations of its level. The summer rise may exceed 20 ft. and sudden freshets are not uncommon in spring and summer. In the lower reaches the current in winter runs at 2½–3 knots, but is much accelerated at high river and in rapids. The upper part above Yingtak has steeper gradients and narrows considerably, especially where it flows through gorges; there are many rapids and sandbanks and the current is swift. The Pei kiang valley is one of the main routes from the Yangtze valley to South China, and from its headwaters it leads through the Meiling pass by the Kan kiang system to Poyang hu, and through the Cheling pass by the Siang kiang system to Tungting hu (see p. 537). In the past it has been a great highway of commerce, but the Canton–Hankow railway has now largely superseded it (Plates 130, 157). It still carries much junk traffic and is used extensively for floating down timber rafts from the forests of the Nanling.

Up to Yingtak, 90 miles above Samshui, the Pei kiang though shallow in parts presents few difficulties to navigation, and steam launches of 4 ft. draught can reach Tsingyun for seven months of the year and Yingtak from May to September. Above Yingtak navigation depends on the rise due to summer rains, and only from April to June can vessels of 2½ ft. draught depend on reaching Shiuchow. Above Shiuchow the Yuan shui branch provides a difficult route north-eastwards for shallow-draught junks to Namyung on the Kiangsi border at the foot of the Meiling pass. The Wu shui branch, though still more difficult, is used by small craft north-west to the Cheling pass on the Hunan border.

The two most important tributaries, both from the west, are the Sui kiang (Bamboo river) and the Hwangshui kiang. The Sui kiang, which enters the Pei kiang near Samshui, is a narrow stream much impeded by sandbanks, but launches of up to 4 ft. draught travel to Szewui, 14 miles upstream and small boats get a further 65 miles to Waitsap in eastern Kwangsi. The Hwangshui kiang, which enters the main river some distance south of Yingtak, is much obstructed by rapids. Boats of 2 ft. draught ascend for about 100 miles to Linchow, and smaller craft are said to be able to go nearly as far as the Hunan border.

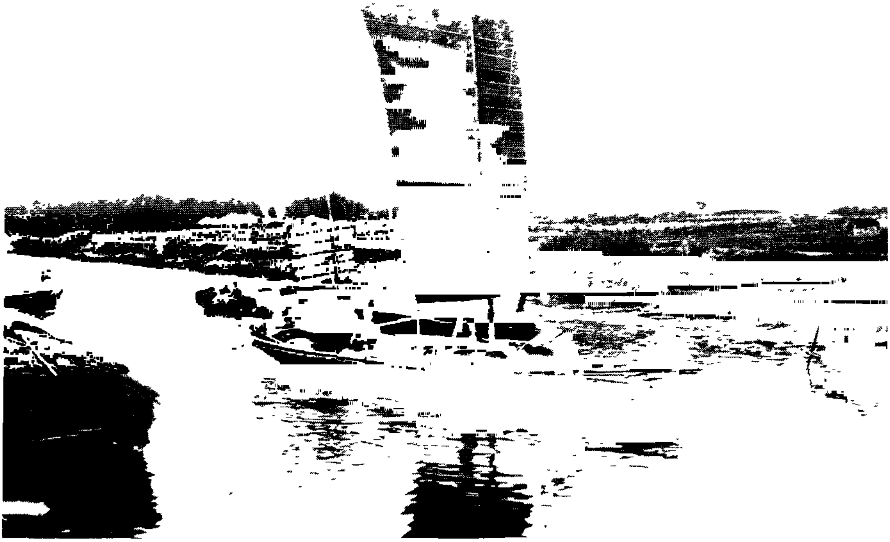

Plate 153. Junk, Canton delta
The delta waterways serve as the main lines of communication in the area.

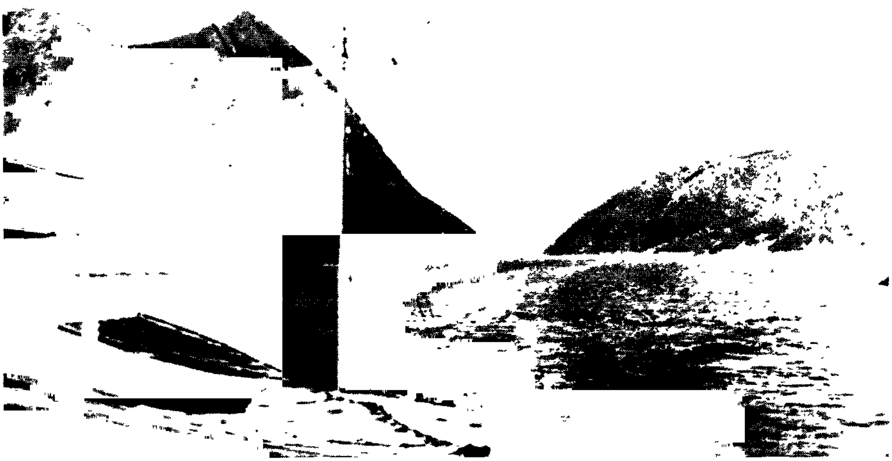

Plate 154. The Si kiang gorges
A view in one of the gorge stretches between Samshui and Wuchow

Plate 155. The Si kiang at Dosing, Kwangtung
Dosing is a small river port on the Si kiang about 40 miles below Wuchow.

Plate 156. The Si kiang below Nanning
A river steamer in the Si kiang between Sunchow and Nanning; in the background are the typical limestone hills of Kwangsi.

(10) *Kwei kiang*

The trend of the Kwei kiang from its confluence with the Si kiang at Wuchow to its headwaters in the mountains of northern Kwangsi is generally northward. It is subject to rapid fluctuation of level and has many dangerous rapids. In summer, vessels of about $3\frac{1}{2}$ ft. draught have reached Pinglo (Plate 158) and junks of $1\frac{1}{2}$ ft. draught ascend to Kweilin from June to August. The Kwei kiang valley is of historic importance since it provided a much-used route from Kwangsi, through the Kweilin pass to the upper Siang kiang and thence to Tungting hu and the Yangtze. A canal connects the headwaters of the Kwei kiang with those of the Siang kiang, thus forming a continuous if difficult waterway for small craft (Plate 159). Like the Pei kiang, the Kwei kiang is of considerable value in floating down timber from the forests of the Nanling Belt (Plate 26).

In 1938 the National Economic Council undertook a project to improve the most difficult section of the Kweien-Siang waterway between Kweilin and Chuanhsien with the object of furthering water communications between Hunan and Kwangsi. This short section is so difficult that small boats with loads only of 3 tons took 18 days to traverse the distance of about 90 miles. It was hoped to reduce the sailing time by half and to open the route at all times to vessels of deeper draught.

(11) *Hungshui kiang*

The Hungshui kiang is a swift stream, especially in summer floods, flowing through many gorges and encountered by rapids. From its confluence with the Si kiang at Sünchow north-west to Shihlung, near which its main tributary, the Liu kiang, enters it from the north, it is navigable by junks of up to 2 ft. draught at all seasons. About Shihlung the river has a long winding course westward through mountainous country and is practically unnavigable. The Liu kiang, though also a difficult stream, is used by large junks at high river to Liuchow, 155 miles from Sunchow, while small junks ascend a further 70 miles to Changan. The Liu kiang is also used for floating timber-rafts downstream from Kweichow and Hunan.

(12) *Tso kiang*

From its confluence with the Yu kiang, above Nanning, the general trend of the Tso kiang is south-west to the Tongking border. In parts there are difficult rapids, and at many points the river is shoal,

obstructed by islets and sandbanks. Only vessels of 1 ft. draught can generally reach Lungchow (see p. 233), 205 miles above Nanning, but shallow-draught launches may make the journey at high river (Plate 160). Above Lungchow the Tso kiang is unnavigable except for sampans and rafts.

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Chapter XIII

BRITISH INTERESTS IN CHINA AND HONG KONG

The Nature of British Interests: The Treaty Port System: Trade and Investments up to 1914: The Effects of the War of 1914–18: Trade and Investments, 1919–37: The Effects of the Sino-Japanese War: Future Prospects: Bibliographical Note.

The Nature of British Interests

When war broke out with Japan in December 1941 British interests in China were divisible into the following classes: commercial, financial, industrial, shipping, railway, mining, cultural (i.e. educational, medical, and missionary) and the treaty rights comprehending them. Closely linked with all these interests were British interests in Hong Kong, which, while politically part of the British Empire, was in most respects, though not in all, economically part of China. The connexion between the two sets of interests was, indeed, so close that it is impossible to survey the one without reference to the other, the governing factor in the relationship being geographical. Less closely linked with British interests in China were those in Malaya. This connexion was mainly commercial, and in that respect resembled the link between China and other parts of the British Empire, notably India, Australia, and Canada. It differed, however, in this important respect, that about 41 per cent. of the inhabitants of British Malaya were Chinese, whose annual remittances to China, which was regarded by a large percentage of them as their mother country, formed an important element in China's invisible exports and enabled her to import more than she would otherwise have been able to buy.

Owing to the Sino-Japanese hostilities, which broke out in 1937, these various interests had been operating under war conditions for a long period before the Japanese began the Pacific war. Some of them had suffered considerable damage, notably railways built with British capital, while the activities of British coastal and river shipping had been greatly curtailed. Certain local British interests, more particularly those capitalized in Chinese currency, enjoyed an unusual degree of prosperity owing to the artificial conditions which prevailed; but in general British interests were affected adversely.

The capture of Hong Kong by the Japanese brought most of our economic relations with China virtually to an end, while on 11 January 1943 the treaty framework in which they had grown up was to a large extent abandoned by a formal surrender of extra-territorial rights.

Nevertheless, in tracing the development of British interests in China it is necessary to describe the framework—for two reasons. In the first place, without the various rights which accompanied extraterritoriality, such interests could not have assumed either the extent or the form which characterized them; secondly, post-war resumption of our activities will require a new commercial treaty, the negotiation of which will probably involve a good deal of reference to rights and privileges in process of abrogation.

The Treaty Port System

The foundation of the system was laid by the treaties of Nanking, 1842, and Tientsin, 1858. Prior to 1834 our trade had been conducted as a monopoly by the East India Company, and had been confined to Canton and Macao. The company established a factory at Canton in 1715. All business was transacted through a guild of Chinese merchants known as the Co-Hong, through whom also all representations to Chinese officialdom had to be made. Notwithstanding embassies sent to Peking—in 1792 under Lord Macartney, and in 1816 under Lord Amherst—with a view to establishing normal diplomatic relations, the Chinese government was unwilling to enlarge the scope, or to change the nature, of the relations which the East India Company had established.

Presently these relations came to include the importation of opium into China. Though importation was prohibited in 1800, for twenty years no serious attention was paid to the edict, and not until 1836 was a genuine attempt made to stop, or even to check, the trade. Meanwhile it continued with increasing vigour, the result being an alteration in the balance of trade. Hitherto China had been an importer of silver, for British purchases from her were paid for in bullion to a much larger extent than in goods. But now, as the demands for opium grew, and importations of the drug went up by leaps and bounds, China had to part with silver in steadily increasing quantities. Both her moralists and her economists regarded the trade with increasing dislike and alarm. The friction which it occasioned was increased by other circumstances: the absence of direct intercourse between British officials and the Chinese govern-

ment; irregularities and arbitrariness in the application of the import tariff; affrays between our sailors and the local peasantry; the differences between British and Chinese legal conceptions and practices which settlement of such matters revealed; the confined conditions of life at Canton, and the mutual resentment created by Chinese arrogance and British assertiveness. Ultimately, after large stocks of opium had been seized by the Chinese authorities, war broke out between Great Britain and China, its first phase being concluded by the Treaty of Nanking, its second by the Treaty of Tientsin, and its third and final phase by the Convention of Peking signed in 1860. Of the third phase, H. B. Morse says:

'This third war, conducted with adequate forces, finally brought China to her knees . . . as the result of three wars the Chinese learned . . . that, whereas formerly it was China which dictated the conditions under which international relations were to be maintained, now it was the Western nations which imposed their will on China.' [1]

As a result a system was created of which the following were the main features:

(i) *The Treaty Ports.* Specified ports were opened to foreign trade and residences. The first five, opened by the Treaty of Nanking, were Canton, Amoy, Foochow, Ningpo, and Shanghai, the island of Hong Kong being ceded to Great Britain in perpetuity. The Treaty of Tientsin added Swatow, Chefoo, Kiungchow in Hainan, Taiwan in Formosa, and Newchwang. The Convention of Peking added Tientsin and ceded Kowloon, on the mainland opposite Hong Kong, to Great Britain. In pursuance of a clause in the Treaty of Tientsin, which gave British merchant ships the right to trade on the Yangtze, Chinkiang and Hankow were opened in 1861. Later other ports were opened, some by agreement between Great Britain and China, others by agreement between China and other Powers, the ports of Samshui, Kongmoon, Wuchow, Nanning, Tengyueh, Wenchow, Wuhu, Kiukiang and Chungking being opened at Great Britain's instance. In certain cases ports were opened by China at her own will. Ultimately there were some 46 maritime and riverine ports (vol. ii, Fig. 2).

(ii) *Settlements and Concessions.* In some of these ports, at various dates, areas were demarcated as foreign settlements, in others as

[1] Morse, H. B., *International Relations of the Chinese Empire; The Period of Conflict*, 1834–60, p. 617 (London, 1910).

concessions. The most important settlement was the International Settlement of Shanghai. At Tientsin, Hankow, Canton, Amoy, Newchwang, Kiukiang, Chinkiang, and elsewhere there were British and other foreign concessions, the distinction between a settlement and a concession being that, in the former, land was acquired by foreigners direct from its Chinese owners, while in the latter the Chinese government leased the land needed to the foreign Power concerned, the latter subsequently leasing it to its nationals for long terms in suitable lots. In both cases the foreign community was self-governing.

(iii) *Extraterritoriality*. The dominating element in this self-government was extraterritoriality by virtue of which foreigners were subject only to the jurisdiction of their own courts. This freedom from Chinese jurisdiction was not confined to the ports but was a right enjoyed throughout the country. In course of time extraterritoriality became applicable to business concerns, an extension that was not contemplated when the treaties were first made.

(iv) *Tax Obligations*. A fourth feature of the treaty port system was liability to pay only such taxes as had been agreed to by treaty. Of these the chief were land tax and customs duties. The latter, both specific and *ad valorem*, were fixed on a 5 per cent. basis and could not be varied without international consent. Collection of duties, import and export, and of dues payable in respect of inland transit, came, during the Taiping rebellion, under the control of the foreign-directed Imperial Chinese Maritime Customs, with Chinese superintendents and foreign commissioners, the former collecting and remitting funds and the latter checking and reporting to Peking the amounts collected and remitted. An elaborate and extremely efficient service was organized by Sir Robert Hart, who presided over it as Inspector-General from 1863 to 1908. He was succeeded first by F. A. Aglen (subsequently Sir Francis Aglen) and later by his nephew, F. W. Maze (subsequently Sir Frederick Maze). The Chinese Maritime Customs Service, as it came to be known later, also supervised and maintained China's coastal and riverine lights and harbours. The Customs revenue became the chief security for a number of loans (see p. 568).

(v) *Foreign Rights in Coastal and Inland Waters Navigation*. Yet another feature of the treaty port system was participation by foreign vessels in coastal and riverine trade. In the first instance this began without treaty authorization. In 1863, however, article 44 of Denmark's treaty with China provided that Chinese produce might be

carried coastwise in Danish vessels. By virtue of most-favoured-nation treatment, for which every foreign Power stipulated when making a treaty with China, what was conceded to Denmark was automatically conceded to all.

In these various ways there came to exist in China a foreign *imperiam in imperio* which economically was very powerful. In most respects free from Chinese control, its command of capital and technical skill, of which China possessed very little, enabled it to take, and keep, the lead in the utilization of the country's natural resources, and to plan its development on lines primarily considered from the point of view of foreign enterprise. Unlike the Japanese government, which in the early years of re-entry into relations with the West was faced with the likelihood of similar domination, the Chinese government took few of the steps necessary to modernize the country and enable it to face new conditions. It may be said, indeed, that China brought much of the exploitation from which she suffered on herself, and, on the other hand, that foreign development of trade, industry, and communications was accompanied by benefits of a substantial and lasting kind. Nevertheless, in reviewing the history of British enterprise in China it is important to appreciate the special characteristics of the environment in which our remarkable success was achieved.

Trade and Investments up to 1914

Down to a year or two preceding the war of 1914–18 our commercial success easily outclassed that of other countries. In 1880, 1890, and 1913 Great Britain's share of China's import trade was 26 per cent., 19 per cent., and 17 per cent. respectively, the combined share of India, Singapore, and the Straits, Australia, New Zealand, South Africa, and Canada amounting, between 1890 and 1913, to about 10 per cent. This large proportion was to a great extent due to our predominance in the cotton piece-goods trade, which in the nineties was responsible for over 65 per cent. of the total value of China's imports from Great Britain, and for more than 55 per cent. as late as 1912.

British shipping, too, was a long way ahead. In the eighties our tonnage, ocean and coasting, was over 11 million tons, out of a total, entered and cleared, of approximately 17,589,000 tons. In 1883 our nearest foreign, i.e. non-Chinese, competitor was Germany, with a total tonnage of no more than 774,000. Twenty years later our tonnage was still about twice as large as Germany's and Japan's

combined. In 1912 Japan's total was just on 20,000,000 tons and Germany's a little over 6,000,000 tons. British predominance was most marked in the coasting trade, our total tonnage being just under 28,000,000, approximately twice as much as Japan's. The bulk of this coasting trade was in the hands of two concerns whose connexion with Chinese trade goes back to early days, the China Navigation Co. (Butterfield and Swire) established in 1872, and the Indo-China Steam Navigation Co. (Jardine, Matheson and Co.) established in 1881. The Hong Kong, Canton, and Macao s.s. Co. was established as early as 1865, while in 1883 the Douglas Steamship Co. was formed. The concern known as Mollers Ltd. dates back to the 1859–69 period.

The Trade Functions of Hong Kong. Hong Kong played an important part in our commercial success, largely owing, as in the case of Singapore in the Malayan Far East, to its being a free port. For over forty years nearly half of the United Kingdom's exports to China passed through the colony. Thereafter the proportion decreased considerably, for Shanghai's importance exceeded Hong Kong's. On the other hand, the colony's share of China's total trade remained large. On the eve of the war of 1914–18 it was a little under 30 per cent. The year 1898 marks an important stage in its history, for in that year, as an off-set against a 99-year lease of Kwang-chowwan acquired by France, the British government obtained a similar lease of the hinterland of Kowloon, which, as we have seen, became part of the colony by the Convention of Peking in 1860. The lease included the waters of Deep bay and Mirs bay and all the waters and islands north of lat. 22° 9′ N., and between long. 113° 52′ and 114° 30′ E. It was in 1898 also that a concession was obtained for the construction of a railway to link Kowloon with Canton, though, as we shall see presently, the enterprise hung fire for some years.

Railway Investments. In this pre-1914 period railway building was a highly competitive field of enterprise. This was due to political considerations which obtained at that time. Prior to 1903, when King Edward VII visited Paris with the definite intention of improving relations between Great Britain and France, French and Russian activities were regarded with considerable suspicion. French aims in Egypt, and what were believed to be Russian designs in India, resulted in both Powers being regarded as potential enemies. When they began to turn their attention to China, where hitherto Great Britain had been dominant, the worst construction was not unnaturally placed on their plans, which, indeed, were patently of

Plate 157. The Pei kiang near Yingtak, Kwangtung
The Canton–Hankow railway can be seen on the left.

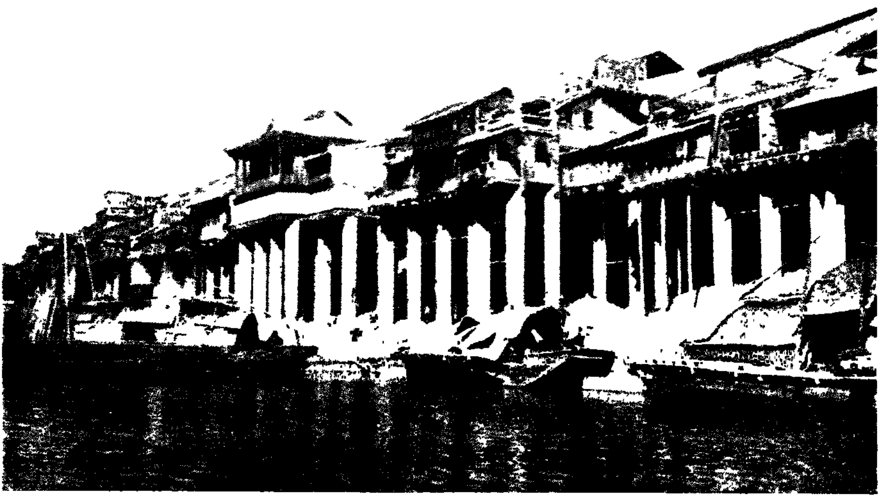

Plate 158. The Kwei kiang at Pinglo, Kwangsi
The buildings at Pinglo waterfront are constructed on piles to allow for the seasonal variations in level of the Kwei kiang, here seen at low winter level.

Plate 159. The Kwei kiang near Hingan, Kwangsi
On the left is the entrance to the canal which links the Kwei kiang with the headwaters of the Siang kiang.

Plate 160. The Tso kiang at Lungchow, Kwangsi
A view of the iron bridge crossing the Tso kiang at Lungchow.

an ambitious and acquisitive kind. Moreover, Japan's defeat of China in 1894–95 had proved that the Manchu Empire was unexpectedly weak, so weak, in fact, that it might well be divided up by aggressive Powers. Such a prospect was threatening to British commercial interests, which favoured the preservation of China's territorial integrity and the maintenance of a market open to all. Railways were capable of subserving this purpose, but they were also capable of serving a policy of exclusion and territorial control. Accordingly much rival diplomatic activity was associated with them (see pp. 458–60).

The British government gave diplomatic support to projects conceived by the Hong Kong and Shanghai Banking Corporation which had established itself in Hong Kong and Shanghai in 1865 and Jardine, Matheson and Co., established in 1832. In 1898 these concerns combined to form the British and Chinese Corporation, which in October that year concluded an agreement with the Chinese government for the continuation to Sinmin of a railway that had been built for the Chinese government by a British engineer, between Peking and Shanhaikwan. The agreement was concluded in spite of the opposition of Russia, who desired to keep Manchuria as a field for Russian enterprise alone. It provided also for the construction of a branch line to Yingkow (Newchwang), the sum lent to the Chinese government for these projects being £2,300,000, repayable in forty-five years, during which period the chief engineer was to be a British subject. Ultimately continued from Sinmin to Mukden, the line is now known as the Peking–Mukden railway.

In the same year, as has already been noted, the British and Chinese Corporation obtained a concession to build a line between Canton and Kowloon. A final agreement, however, was not made till 1907. The section of the line between Canton and the border of the New Territories of Kowloon was completed in 1911. The part between the border and Kowloon was financed and built by the Hong Kong government, and was opened in 1910.

Meanwhile the British-built Shanghai–Nanking railway had been completed. This was also contracted for by the British and Chinese Corporation in 1898, though a final agreement was not made till July 1903, when a fifty-year loan of £3,250,000 at 5 per cent. was authorized. The line was completed in 1908.

The next big railway project in which British capital was invested was the Tientsin–Pukow railway. This was originally negotiated as an Anglo-German enterprise by the Hong Kong and Shanghai

Bank (acting for the British and Chinese Corporation) and the *Deutsch-Asiatische Bank* in 1899. But the Boxer rising intervened and a fresh contract was made in January 1908. This provided for a loan of £5,000,000 at 5 per cent., a subsequent agreement providing for a further sum of £3,000,000 at the same rate. The line was built in two sections, a northern section from Tientsin to the southern border of Shantung province, built by the Germans; and a southern section from there to Pukow, on the north bank of the Yangtze, built by the British. The latter section was opened to traffic in June 1912, the British share of the first portion of the loan being £1,850,000, and of the second portion, £1,110,000. The term of each loan was thirty years.

In March 1908 the British and Chinese Corporation made an agreement with the Chinese government for the construction of a line linking Shanghai, Hangchow, and Ningpo, the sum involved being £1,500,000, at 5 per cent. for thirty years. From Shanghai to Hangchow the line was opened in August 1909. The Ningpo section was not completed till 1916.

In May 1911 the Hong Kong and Shanghai Bank participated with the *Deutsch-Asiatische Bank*, the *Banque de l'Indo-Chine* and an American group of banks in an agreement with the Chinese government for an immediate loan of £6,000,000 at 5 per cent., and a later loan, if required, not to exceed £4,000,000, repayable in forty years, for the construction of the Hupeh-Hunan section of a line from Hankow to Canton; for the building of a line between Kwangshui and Ichang, and for a line running from Ichang to Kweichow in Szechwan. A British engineer was to build the Hupeh-Hunan section, a German engineer the Kwangshui-Ichang line, while an American engineer was to build the line from Ichang to Kweichow. The anti-Manchu revolution and subsequently the war of 1914–18 interfered with the construction of the British section, the British share of the loan being £1,500,000. By 1914 this section had been carried as far as Changsha. On the American and German sections, however, no appreciable amount of work was ever done.

Mining Investments. Meanwhile there had been considerable mining and industrial development. British interest in coal mining, indeed, preceded interest in railways, though its importance has not been as great. In 1897 a concern known as the Pekin Syndicate was formed to exploit mineral resources believed by an Italian, Commendatore Angelo Luzatti, to exist in rich quantities in Shansi and elsewhere in North China. In the following year coal-mining

rights in Shansi and Honan were obtained. The original capital of the company, no more than £20,000, was increased, partly with a view to such railway construction as might seem desirable. Surveys were also made for a line connecting the proposed mines with the Wei ho and with the Yangtze at Pukow—the port already mentioned in connexion with the Tientsin-Pukow railway. The Boxer rebellion caused a halt, but some years later, in 1915, the Syndicate made an agreement with the Chinese government for a loan of £700,000 to cover the cost of building a line between Taokow and Tsinghwa, a distance of a little over 90 miles.

The Syndicate's activities met with opposition from Chinese mining concerns in both the provinces covered by its concession. In Shansi this led it to surrender its rights in return for a payment of Tls. 2,700,000. In Honan opposition was ultimately disposed of by an amalgamation of interests, when a corporation called the Fuchung Corporation was created with a capital of £1,000,000. This was managed by three representatives of each of the concerns embraced by the Corporation—the Syndicate and the Chung Yuan Company. The amalgamation occurred during the war of 1914–18.

A year or two after the creation of the Pekin Syndicate, a British concern known as the Chinese Engineering and Mining Company was formed to mine coal in the area between Shanhaikwan and Taku, at the mouth of the Pei ho. The coal had previously been mined by a Chinese concern, which was now sold to the British company. The company's experience in the matter of local opposition resembled that of the Pekin Syndicate, and it took comparable steps. A new organization known as the Kailan Mining Administration was created to manage both the British concern and its rival—the Lanchow Mining Co.—on a basis which gave 60 per cent. of profits up to £300,000 to the former and 40 per cent. to the latter, profits in excess of that total being divided equally. By 1913 the output of coal had reached a total of 2,036,966 tons.

Developments in Manufacturing Industry. Manufacturing industries on a significant scale began after the first Sino-Japanese war of 1894–95. The Treaty of Shimonoseki, which ended the war, gave the Japanese the right to manufacture in China, and the most-favoured-nation clause in our treaties extended the right to us. In 1897, Jardine, Matheson and Co. established the Ewo Cotton Spinning and Weaving Co., with 50,000 spindles, in Shanghai. By 1914, Jardine's were managers also of two other mills, the Kung Yik and the Yangtzepoo, their spindles totalling 153,320, their looms 1,900.

Even before this treaty a few foreign concerns had engaged in manufacturing, although in the face of semi-official protests from the Chinese. An Englishman, A. W. Danforth, had played a leading part in the development of two Chinese concerns, the Shanghai Cotton Cloth Mill Company and the Hua Sheng Cheong Company.

In Hong Kong manufacturing development, not unnaturally, began earlier. The Taikoo Sugar Refining Co.—Taikoo being the Chinese name of Butterfield and Swire—was established in 1883, the date also of the establishment of the Hong Kong Rope Manufacturing Co. Three years later A. S. Watson and Co. began the manufacture of aerated waters, while in 1889 the Green Island Cement Co. came into existence. Semi-industrial concerns established in Hong Kong between that year and 1901 were the Hong Kong Electric Co., the Ice and Cold Storage Co., and the China Light and Power Co.

An important Shanghai transport company, the Shanghai Electric Construction Co., capitalized in sterling, was incorporated in 1905. In passing, it should be noted that land investments were amongst our early interests, the Shanghai Land Investment Co. being formed in 1888 and the Hong Kong Land Investment Co. in 1889. The Hotung Land Co., Tientsin, was formed in 1902

Loans. It will be realized that these various developments—trade, shipping, railways, mines, and industries—involved a considerable amount of capital. By 1914, it has been estimated, business investments of one kind and another totalled not less than £82,000,000, while further sums of about half that amount had been invested in Chinese government loans, including railway loans, which, in this particular computation,[1] are not itemized under business investments. Apart from railway loans, Chinese government borrowings from British financial sources included the British share of Anglo-German loans made in 1896 and 1898, the British amounts outstanding in 1913 being £12,662,000; and the British share of an international loan of £25,000,000, known as the Reorganization Loan, made to China in 1913, of which naturally the bulk, £7,416,000, was outstanding at the outbreak of the war of 1914–18. In addition there were other loans, but these were the chief.

It is interesting to compare these totals with those of American and Japanese investments at this time. Remer has estimated that American capital in China in 1914 was approximately £12,186,000—of which, it may be noted, over a fifth represented mission property.

[1] Remer, C. F., *Foreign Investments in China*, p. 135 (New York, 1933).

The Japanese total was about £45,131,000, the bulk of it being invested in Manchuria.

Emphasis should be laid on the security furnished by the Customs revenue for loans made to the Chinese government for general purposes (see table on p. 568). The Reorganization Loan was at first secured on the Salt revenue, of which Sir Richard Dane, who had had a distinguished career in India, was made Inspector-General. But later on the Customs revenue became the security. This revenue was also security for the indemnity for which China became liable as a result of the Boxer rising of 1900. The indemnity totalled 450,000,000 Haikwan or Customs taels, payable over a period scheduled to end in 1940, the British share, principal and interest, being approximately £16,573,000. The importance attached by foreigners in general, and by the British in particular, to the administration built up by Sir Robert Hart is thus easily understood.

The Effects of the War of 1914–18

The war of 1914–18 made great changes in the circumstances described above. While Japan, whose exports to China had exceeded the United Kingdom's shortly before its outbreak, moved definitely into the lead, and Great Britain's long period of commercial predominance became a thing of the past, China's industrialization received an impetus from the necessity—and the opportunity—of making for herself commodities hitherto bought from abroad. Her discovery of her ability to do this was accompanied by realization of the artificiality of the united front which the Powers, notwithstanding their competitiveness, had maintained against her when their mutual interests were concerned. Germany and Austria were deprived, with every encouragement from the Allies, of their extraterritorial rights, and this led the Chinese to argue that the continued enjoyment of these rights by the Allies thereby lost such justification as had been derived from the alleged unsuitability of the Chinese legal system for Europeans. The cynicism—as it appeared to the Chinese—of the Allies' undiminished pretentiousness in this matter, was enhanced by the transfer, in the terms of the Treaty of Versailles, of Tsingtao from Germany to Japan, notwithstanding the evidence which the latter had given, in the 'Twenty-one Demands' made on China in 1915, of complete disregard for her independence.

From these various sources there welled up a nationalist feeling which increased rapidly in strength and presently began to challenge, in modern diplomatic language which a new generation of Chinese

CHINESE GOVERNMENT STERLING RAILWAY LOANS IN WHICH BRITISH CAPITAL IS INVESTED

Loan	Original amount of loan	Rate of Interest	Balance of Principal outstanding 30 June 1937	Balance of Principal outstanding 30 June 1941
	£	%	£	£
Peking–Mukden (1898–1944) [1] ..	2,300,000	5	460,000	230,000
Shanghai–Nanking (1904–53)	2,900,000	5	2,784,000	2,784,000
Shanghai–Hangchow–Ningpo (1936–61)	1,100,000	6	1,100,000	1,100,000
Hukuang railways (1911–51)	6,000,000	2½–5	5,656,000	5,656,000
Canton–Kowloon (1907–37)	1,500,000	2½–5	1,106,000	1,101,500
Honan (1905–35) ..	800,000	2½–5	485,700	475,700
Shanghai–Fenching (1914–38)	375,000	6	262,000	225,000
Tientsin–Pukow (1908–38) British Issue	1,850,000	2½–5	1,156,250	1,156,250
Tientsin–Pukow Supplementary (1910–40) British Issue	1,110,000	2½–5	888,000	888,000
Total	17,935,000	—	13,898,950	13,616,450

[1] The dates of floating and of prospective redemption respectively are given in the case of each loan.

Source: Gull, E. M., *British Economic Interests in the Far East*, p. 195 (London, 1943).

LOANS SECURED ON THE MARITIME CUSTOMS AND SALT REVENUES

Secured on the Customs Revenues

The estimated British holding of the £2,996,425 outstanding of the 1898 4½ per cent. loan on 31 December 1941 was £2,500,000.

Of the 5 per cent. Reorganization Loan, 1913, of £19,691,880, originally secured on the Salt revenue, the estimated British holding on the same date was £11,000,000.

Of the Boxer Indemnity Loan, 1934, of £1,500,000, £972,000 was outstanding on 31 December 1941. The whole of this amount is believed to be British held.

Secured on the Salt Revenues

The estimated British holdings of the amounts outstanding of loans secured on the Salt revenue at the date given above were:

Anglo-French Loan, 1908	£170,000
5 per cent. Gold Loan, 1912	£5,000,000
Hukuang Railway Loan	£2,000,000
Marconi and Vickers Loans, 1918–19	£2,000,000

diplomatists had learned to use with telling effect, the justice and reasonableness of the whole treaty port system. At the Washington Conference, 1921–22, China succeeded in obtaining from the Powers resolutions ensuring that action would be taken in respect of the crucial questions of the tariff and extraterritoriality. Within five years, under the leadership of the Kuomintang—headed by Sun-Yat-sen and helped in respect of revolutionary technique by Russian advisers—China succeeded both in persuading Great Britain of the wisdom of adopting a new and realistic attitude towards her aspirations, and in throwing off the yoke which her own war-lords had fastened on her during the domestic debacle that succeeded the overthrow of the Manchu dynasty in 1911–12. An anti-British boycott, which was particularly effective in respect of our trade in South China, was one of the devices employed by the Chinese.

Trade and Investments, 1919–37

British interests then entered upon a new phase. In the commercial sphere this was marked by a rapid decline in the value of the trade which had been the basis of our commercial supremacy—the trade in cotton piece-goods. Japanese cotton goods, and cotton goods manufactured by China herself, quickly narrowed the scope left for Lancashire's goods, a process which Japan, too, began to feel after China acquired tariff autonomy in 1928. China's increasing industrialization, however, opened up fresh opportunities for British, as for Japanese, mills in China, and at the same time widened the market for British, as for other foreign, machinery—for spindles, looms, boilers, and prime movers of all kinds. Under the stimulus of a ' good road ' movement, the vehicles and materials required for transport also came to be in increasing demand. This movement, in turn, reacted upon urban developments in the interior, a new spirit of modernization displaying itself both in economic and governmental ways. A rapid increase in the use of electric power was one of the features of this development.

Thus British manufacturers were presented with widening opportunities in every direction. So, too, however, were those of other countries, notably Germany, the United States, and Japan. Germany's recovery from her exclusion from Far Eastern markets during the war of 1914–18 was rapid and remarkable. The United States, too, were soon exporting goods to China in much larger quantities than hitherto, and competition for the largest share in China's import trade came to lie between them and Japan to the

quite definite relegation of the United Kingdom to third place. British trade in machinery, iron and steel goods, chemicals and miscellaneous manufactures, while evincing sustained standards of quality, were not infrequently handicapped by too high prices and —so at all events it is frequently alleged—by salesmanship less adaptable than that of our competitors.

The following percentages show the United Kingdom's share of China's import trade, and that of the United States and Japan at various periods from 1920 to 1936 :

	1920	1925	1930	1932	1934	1936
United Kingdom ..	16·46	9·65	8·15	11·20	12·00	11·70
U.S.A.	18·79	14·77	17·50	25·43	26·16	19·64
Japan	28·64	31·06	24·63	13·95	12·21	16·26
Other Countries ..	36·11	44·52	49·72	49·42	49·63	52·40

In reading the figures for 1932 and subsequent years the statistical effect of Japan's seizure of Manchuria, and of the exclusion of its trade from the Chinese Customs' returns, should be realized. The effect was to decrease Japan's percentage, for much of her trade was with Manchuria, and to increase ours and that of the United States.

It should also be realized that the British share becomes a good deal larger when China's imports from other parts of the empire are included in the reckoning. Australia, British India, Ceylon, South Africa, Canada, and New Zealand all participated in China's import trade, but British India's share was the most important :

	1932	1934	1936
British Empire ..	20·01	19·17	19·41
British India	2·42	5·09	2·62

China bought more from the United States and Japan than from the United Kingdom, largely because they imported considerably more from China than did the United Kingdom, as the following figures show :

	1932	1934	1936
United Kingdom ..	7·62	9·30	9·18
U.S.A.	12·17	17·63	26·36
Japan	21·80	15·16	14·48

The American figure for 1936 exceeded considerably the whole of the British Empire's share of China's export trade in that year.

In shipping, on the other hand, the British flag retained its supremacy. Of ocean shipping the British share of tonnage entered and cleared in 1936 was 35·72 per cent., the Japanese being 20·82 per cent. and the American 6·90 per cent. only. Of coastal, i.e. interport, shipping, the British share was still higher, namely, 41·28 per cent., the Japanese being 15·53 per cent., and the Chinese (excluding junks) 35·47 per cent. The American share was negligible.

Britain also maintained her dominant position in banking, insurance, and investments. The 1914 total of capital invested in business, £82 million, had by 1931 been increased to just under £198 million, its geographical distribution being, roughly, Shanghai £130 million; the rest of China £30 million, and Hong Kong £35 million.[1] Some 18 per cent. of this amount had been invested in manufacturing. Japan's business investments approximated much more closely to Britain's, being reckoned at £182·5 million in 1930; the bulk of this sum was invested in Manchuria. American business investments totalled the relatively modest figure of £31·9 million.

The growing strength of the Chinese industrial movement explains the relatively large percentage of British investments in industrial enterprises. During this 1914–36 period the movement presented foreign capital with opportunities of more profitable investment than ordinary import and export trade. An assured supply of cheap labour, possession of technical capacities and managerial experience superior to those of Chinese competitors, and the security provided by extraterritorial status combined to make this new and expanding field an attractive one. The British-American Tobacco Co. (China), Ltd., the China Soap Co., Ltd., and Edible Products, Ltd. (both concerns organized by Lever Bros., Ltd.); the China Printing and Finishing Co., Ltd., and Patons and Baldwins, Ltd. are among the well-known names associated with this phase of British interests in China.

British railway interests suffered considerably during this uneven and, in some respects, contradictory period. Upon them, China's political instability had disastrous effects, although upon other enterprises, as figures have shown, it had little or none. By the end of 1935 all the British-financed lines were in default in respect both of interest and amortization except the Peking–Mukden railway. Fresh construction—the completion of the Hankow–Canton rail-

[1] Remer, C. F., *Foreign Investments in China*, pp. 397, 403 (New York, 1933).

way—was financed by a sterling loan of £1,500,000 secured on the outstanding portion of the British share of the Boxer indemnity, which the British government had agreed in 1930 to remit. The Hankow–Canton line was completed in 1936, and in June of that year a 6 per cent. Shanghai–Hangchow–Ningpo Railway Completion Loan of £1,100,000 was issued in Shanghai through the British and Chinese Corporation. In 1936 also, after protracted negotiations, the Chinese government found itself able to resume railway loan interest payments. Hardly had it begun to do so, however, when Japan's aggressive schemes in North China, which had been in continuous development since the seizure of Manchuria, resulted in the outbreak of war.

British interests in Manchuria had been relatively small. They were, however, substantial—an import and export trade valued at between three and four million sterling, and investments estimated at about that figure, perhaps a little less. Between 1932 and 1936 both totals were considerably reduced.

The Effects of the Sino-Japanese War

The many British interests in China were sharply affected by the Sino-Japanese war, and on Japan's entry into the war of 1939–45 they suffered a complete, though temporary, eclipse.

In a sense the interest which suffered most harm was the destruction of China's territorial integrity, the preservation of which had been a cardinal principle of British policy—departed from under duress in 1898—for many decades. With that went also the maintenance of the 'open door.' Economic historians of the future, however, will probably be impressed by the vitality displayed by our trade and institutions rather than by the harm which they inevitably suffered. Thus in 1937 the total value of the United Kingdom's export to China and Hong Kong was approximately £8,586,000, the approximate total in 1936 having been £7,805,000. The British tonnage engaged in China's domestic trade had in 1936 been 41·38 per cent. of the total; in 1940 it was 40·79 per cent. True, British shipping was soon completely excluded from the Yangtze and the Si kiang, and Japan's share increased from 15·53 per cent, to 31·82 per cent.—both the British and the Japanese proportion was increased by the virtual disappearance of Chinese tonnage. Even so, having regard to the fact that Japan was at war with China, the size of the British figure is certainly striking.

The southern section of the Tientsin–Pukow railway, the Shanghai–Nanking, and the Canton–Kowloon lines all suffered damage from military operations, while the arrangements for the resumption of interest payments by China were rendered inoperative. From the bond-holders' point of view, however, matters were worse than they had been only to the extent of the bill for repairs which will confront them after the war. How big this will prove to be depends, on the one hand, upon the extent of repairs effected by the Japanese, and, on the other, upon the policy pursued by the Japanese military during the final stages of the war, when destruction of British property may be widespread and deliberate.

Up to December 1941 damage done to British commercial and residential property was relatively small. How much has been done since, and may be done before Japan is defeated, it is impossible to say. One has, however, only to consult the files of the Shanghai paper, *Finance and Commerce*, for the years 1937–41, to see that many British commercial institutions, more particularly those capitalized in Chinese dollars, enjoyed a considerable measure of prosperity. If the Pekin Syndicate suffered greatly through the Sino-Japanese war, the Kailan Mining Administration and, therefore, the Chinese Engineering and Mining Co., did remarkably well.

Future Prospects

In conclusion, a few words may be said about the outlook for British interests in China.

Certain assumptions have, in the first instance, to be made, the most important being that the present Chinese government will continue at the head of a united China, that the quisling administration of Wang Ching-wei at Nanking will disappear, and that the Communist administration of north-west China will be content to obtain by constitutional means the agrarian and other reforms which it will certainly demand. A second assumption is that China's currency, at present in the throes of a severe inflation, will be stabilized at an internationally acceptable figure.

These assumptions granted, the outlook for British interests will depend, perhaps primarily and certainly to no small extent, upon the success with which men and institutions accustomed to, and nurtured in, an extraterritorial environment adapt themselves to life under Chinese jurisdiction and control. Hitherto, British interests, while subserving China's welfare, have lived by their own

standards and for their own well-being. After the war they will prosper only in so far as they are helpful to China, and are enabled to operate at a reasonable profit.

The outlook will depend, to no less extent, upon the capacity of British manufacturers to produce at competitive prices. This statement has the ring of a truism until the reader is reminded of what has been said above about German and Japanese competition in the supply of China's industrial needs during the post 1914–18 period. For a time, possibly for a very long time, German and Japanese competition will be diminished by the effects of defeat. It is impossible at the time of writing to say to what extent the Allies, in preventing rearmament, will be compelled to control heavy industry in Germany and Japan. For a time, it seems probable, some control will be necessary. On the other hand, British policy is unlikely to lose sight of the necessity of allowing Germany and Japan sufficient economic freedom to ensure stable employment of their large populations, the ultimate welfare of which must inevitably be a factor in the preservation of peace. Moreover, the fact that the standard of life on the continent of Europe and in Japan is likely, as a result of defeat, to be lower than British or American standards may well present British manufacturers with a difficult factor.

The outlook will obviously depend, too, upon China's economic policy. That she will industrialize to a much greater extent than she has so far done is certain. Whether in so doing she will treat her huge labour force as economic fodder, to be consumed in the furnace of pitiless exploitation ; or whether she will seek to improve agrarian occupations, where most of the labour is to be found, and make industrialization an additional means of raising her standard of life is, however, uncertain. Only through a general raising of the standard of life can China become the great market into which generations of traders have expected her to develop.

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Appendix I

NOTE ON DIET AND NUTRITION

In China much of the food consumed by farm families is produced on the farmer's own land, and the improvement of nutrition, therefore, largely depends on changes in the cropping system. It is estimated that for the country as a whole about three-quarters of the food energy in the farmer's diet is derived from his own farm, one-quarter from purchased products, and only about 1 per cent. is collected from wild plants or received as gifts. Grains, seeds of leguminous plants, tuber crops, leafy vegetables and fruit are supplied by the farm, while vegetable oils, sugar, and animal products are chiefly purchased. The amount of food energy consumed varies with the year and the locality, but on an average it is above the minimum requirements, estimated at 2,800 calories per adult male unit per day. In some localities there is an over-abundance, and in others a serious deficiency.

The sources of food energy are mainly vegetarian (grains, seeds of leguminous plants, tuber crops), nearly 98 per cent. being of plant, and only 2 per cent. of animal origin. This is in contrast to the United States, where approximately two-fifths of the food energy consumed by the farmers comes from animal products. Butter and cheese have made no great appeal to the Chinese. It is the consumption of vegetable products rather than animal products which enables the peasant to eke out a living on his small holding. Wheat is more universally found in the diet than rice, and is dominant in the north, where the flour is used for noodles, boiled dumplings, and unleavened biscuits. In the south it gives way to rice, which becomes the staple food. Fruits and nuts occupy an unimportant position, although there is considerable consumption in some of the big cities where transport facilities are available. The Chinese diet is not entirely lacking in meat. Most of it, however, is derived from pigs and poultry, which are in part scavengers and subsist on food which is unfit for human consumption. With the exception of pork and chicken, meat is too expensive for the masses, who eat it only at feasts and occasionally during the rest of the year.

In spite of the relative absence of animal products the Chinese diet is fairly well balanced. Proteins, which are needed to built and

repair, are supplied by vegetable products, such as bean curd, and the average intake is considered to be adequate in both quantity and quality. There are, however, great inequalities between regions and families, and even where the protein intake is sufficient its quality may not be suitable for the nutrition of young children. Fats are obtained in the form of vegetable oils. Roughage and some of the essential salts and vitamins are provided by vegetables, a large proportion of which are served green and not cooked long enough to destroy the beneficial elements.

The nutritive value of the Chinese diet is, however, not completely satisfactory, not so much because of its vegetable character but because the grains are too highly milled, and because an insufficiency of leafy vegetables is consumed. The practice of removing the husk of the rice means that the germ and certain layers covering the germ, which contain valuable salts and vitamins, are also removed. In particular, the important vitamin B is removed, and it is known that deficiency in this may lead to serious nervous and digestive disorders. The constructive measure is to discourage the practice of too fine milling, which seems to be increasing, and is largely responsible for the wide incidence of beri-beri in South China.

Vegetables, especially in North China, are used in very limited quantities, possibly because the farmer is disinclined to master the methods of vegetable growing. As a result there seems to be a serious and widespread deficiency of calcium in the diet of the average farm family, particularly from the standpoint of the needs of the growing child. It is only by increasing the consumption of certain leafy vegetables and such roots as taro that the intake of this mineral can be raised to an adequate level. As far as vitamins are concerned, while there appears to be a sufficiency of A and C, an increased content of D in the diet seems desirable, especially under conditions where sunshine (which creates vitamin D) is available only to a limited extent. It is also important to conserve the vitamin supply by avoiding the large losses which occur as a result of heavy milling.

For the above reasons the diet is barely adequate and permits of no emergency reserve. It is perhaps significant that when students overwork the collapse tends to take the form of tuberculosis rather than nervous exhaustion. Deficiency in food is probably partly responsible for this.

Nutrition requirements, therefore, in China demand certain changes in the type of land utilization. First and foremost is the need

for the production of more greens and leafy vegetables in place of some of the grains now grown. In this way the serious deficiency in calcium could be overcome and the protein and vitamin content of the diet improved. Against this advantage, however, there would be an increase in the bulk and fibre content, and a lowering of the digestibility of a diet which already has its limitations in this respect. The child in particular is less able than the adult to consume such products and assimilate calcium from them. This seems to be the most serious problem in the nutrition of the Chinese farm family.

An increase in the poultry industry, with a greater consumption of eggs, would improve the diet, but the animal product which would most effectively solve the problem of child nutrition is milk. It is by far the best dietary source of calcium and also contains protein and vitamins in a form which can be easily assimilated by children. But milk production seems economically impracticable on the average Chinese farm at the present time, particularly by the dairy cow. It may, however, be possible to increase the use of goat's milk, while some milk may be obtained from the working cow or buffalo on the farm. Ultimately, it is likely that a dairy industry for milk will develop near the big towns, and in parts of the north of China.

Since 1937, attempts have been made to prepare the way for an improvement in nutrition. In 1941 the National Institute of Health made several dietary surveys and nutritional studies and issued a number of booklets for general distribution. A Nutrition Promotion Committee was organized in December 1940. As a preliminary step towards the improvement of nutrition for the Chinese army research has been carried out to obtain actual nutrition conditions among Chinese soldiers in general as well as to prepare a standard list of the minimum diet and nutrition requirements for the various armed forces of China.

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Appendix II

SHIPPING

Introduction: Chinese Junks: The Chinese Mercantile Marine: Foreign Shipping: Shipping Traffic: Bibliographical Note

INTRODUCTION

For centuries the chief means of transport in China has been river and waterway transport. Navigable streams and rivers intersect many parts of the country and in particular the valleys of the three great rivers (see pp. 511–56). Of these the most important traffic artery is the Yangtze, which, owing to its extensive navigable length suitable for large sea-going vessels, must be considered as part of the coastal zone as far as coastwise shipping is concerned. Coastwise shipping in China has fulfilled a role of considerable importance in maintaining long-distance communication between the different parts of the country rendered relatively isolated by poor land communications. It forms the basis for much of the conduct of the domestic trade of the country, and the coastwise rice trade is of special prominence in this respect.

The coastal provinces of south-east China, between Shanghai and Canton, are characterized by a distinct indented coastline with many deep bays and off-lying islands, and the sea forms the principal means of trade and intercourse. As in the case of Norway, fishing and seafaring are among the principal occupations of the people, who here provide the most important maritime population in China (see p. 74). Thus it would appear that conditions are generally favourable for the development of coastwise shipping not only with Chinese sailing craft, but also with steamers. Chinese sailing craft still carry on a considerable coastal and river trade, but largely because of political and economic circumstances China has become greatly dependent upon foreign-operated steamer communications in the coastwise and inland trade. As a result of the so-called 'unequal treaties' of the nineteenth century, many foreign countries could undertake coasting with their own vessels between the treaty ports on the coast and along the Yangtze. This situation is almost unique, as the coastwise trade in most countries is confined rigidly

to vessels of that country, except by special agreements or reciprocal treaties. The foreign trade of China is very largely seaborne and a high percentage of this carrying trade is performed by ships flying foreign flags.

Chinese Junks

There is probably a greater variety of types of craft in China than in any other part of the world, for all vessels are adapted to local physical conditions and to the requirements of trade, although certain basic principles of design are almost universal and the differences may only be variations on a common type of structure. Outstanding among these craft are the junks, perhaps some of the most distinctive vessels in the world, and they range in size from the river junks and innumerable longshore fishing boats to the deep-sea fishing junks, which present different types for almost every port, and more particularly to the great trading junks. Like many other Chinese arts and crafts, the design of the junks shows exceptional originality and independence of development, and the continuity of design from the junks of early times to those of the present day is very marked. A certain degree of conservatism may have been responsible for this, but the basic design is well suited to its purpose.

Historical Background

The seafaring traditions of the Chinese are among the oldest in the world, and they are credited with the invention of several important maritime devices adapted to their own ships, apparently without Western influence and which they adopted sooner than the West. The magnetic compass, according to Chinese records, was invented in China in the twelfth century A.D., although it was used in the West at an earlier date. Other distinctive features include watertight compartments, which were mentioned by Father le Comte in 1687 as a characteristic safety device to prevent the whole hull flooding in case the vessel strikes a rock ; leeboards, which are used to enable a boat to sail more closely into the wind without making excessive leeway ; dagger-boards, long used in South China vessels, which act in a similar fashion to leeboards, but are lowered through a slot in the bottom of the vessel ; and turreted hulls, in which the sides of the hull taper towards the gunwales and thus result in a saving of tonnage dues. Turreted hulls are said to have a pronounced

tumble-home of the topsides and on this a narrow deck is superimposed. Chinese junks made extensive journeys in the eastern seas at quite an early period, and they were the means by which porcelain and other Chinese products were dispersed throughout the East Indies. There is some evidence to suggest that Chinese wares were carried in native craft to Ceylon in the fourth century B.C., and in later centuries regular voyages were made by junks to India and many other parts of the Indian Ocean. Arab traders likewise voyaged eastwards from the Persian gulf and established contacts with the Chinese seafarers. Canton was the centre of this sea trade in China in the eighth century A.D. (see vol. ii, p. 7). By the thirteenth century sea communications extended from China to Japan, Korea, the East Indies archipelago, the shores of the Indian Ocean as far as the Persian gulf, and the East African coast to Zanzibar.

In the early part of the thirteenth century, during the period of the Yuan dynasty, and also at the beginning of the Ming dynasty in the late fourteenth century, junks of small types are recorded as trading between the old mouth of the Yellow river, south of Haichow, and Shantung; they were used for the transportation of rice. In the fifteenth century a fleet of junks sailed to Cambodia, the East Indies, Siam, Ceylon, the Persian gulf, the Red sea, and the east coast of Africa. Descriptions of junks trading in the East Indies in the early part of the seventeenth century show that return voyages from the Philippines to Foochow and other ports were made in ballast, and those junks trading to Java brought porcelain, silk, satins, and damasks of Chinese manufacture and returned home with pepper, ivory, lacquer, tortoise shells, indigo, sandalwood, nutmegs, and cloves. Gradually, however, the Chinese lost their monopoly of many of these trade routes to the Portuguese and other navigators, and although the junks in some cases made long voyages, they generally ceased visiting the Persian gulf and India and restricted their range to the East Indies. Four outstanding voyages have been made by Chinese junks during the last hundred years. The *Keying* sailed from Hong Kong to Boston, U.S.A., and reached London in 1848, after being the first junk to round the Cape of Good Hope; the *Whangpo* voyaged from Hong Kong to Sydney in 1908, and the *Ningpo* made the voyage from Shanghai to San Francisco, leaving in September 1912 and arriving in February 1913. This vessel was worked by a Chinese crew but had a Danish master. A smaller type of vessel, a fishing junk from Amoy, made a passage to Vancouver in 1922. Such voyages are, how-

ever, exceptional, and the coming of steam has restricted the profitable range of junks to coastwise voyages. Even here the number of junks is diminishing before the rapid advance of steamers and motor vessels.

Junk Design

The hull of the junk is usually flat-bottomed and built of light pine. In the Foochow pole junk transverse bulkheads every 8 ft. and longitudinal bulkheads every 4 ft. divide the hull into watertight compartments ; in other types the number and distance apart of the bulkheads vary according to the size and function of the particular type, while Hainan (Hylam) junks are exceptional in having a hold completely open from end to end of the hull. These compartments serve not only as a safety measure but they form units for commercial uses. Chinese shippers book one or more compartments at a flat rate for each voyage, and this space is therefore utilized to the fullest possible extent. The bow and stern are frequently square and bluff. The masts are usually poles of Foochow pine (*Cunninghamia lanceolata*) and are devoid of stays and shrouds. They are usually raked at different angles, and are often out of the centre line to take advantage of different winds. The sail used almost universally is the balanced lug made of brown cotton cloth, with nearly horizontal bamboo battens to stiffen and extend it. Formerly reed matting was used as a sail material. The lug sail is the type most easily handled in the sudden squalls and typhoons which are so common along the coast at certain seasons. Chinese sailors early discovered the value of high canvas as a means of catching the light airs over the river banks. Jibs are not used, and the headsail consists of a lug on a mast stepped well forward and raking over the bow. A headsail in the form of a canvas jib is used in many Chinese vessels, particularly those fitted with a bowsprit. Some of the smaller cargo junks from Canton, Macao, and Hong Kong are examples. A small Chinese lugsail usually replaces the jib as a headsail, but in the larger craft this lugsail assumes the proportions of a foresail. The rudder is a heavy piece of wood fitting into sockets, and it can be raised clear of the flat bottom in harbour and before beaching ; when the vessel is under way the rudder is lowered below the bottom and serves to steer the ship and to prevent leeward drift. River vessels or vessels in calms utilize the *yuloh* or sweep, a Chinese invention for propulsion in inland waters. It is used for sculling and is the most efficient means of propelling a ship by one man, and it consists of a spar, usually in two pieces, pivoted on the stern.

Types of Junks

The design and decoration of the hull, and the cut of the lugsail and the type of rig, vary considerably according to the part of the coast and the home port of the junk. There are two main types of junks, those typical of the northern coasts and those typical of the southern coasts south of the mouth of the Yangtze.

The Pechili trader is characteristic of the northern junks, and is probably the oldest surviving type of Chinese ocean-going craft, and the rig has largely remained the same to the present day. It is probable that this type of vessel was the one used for the trade with East Africa and the Red Sea some centuries ago; and they were built in Shantung and at Shanghai, but to-day no more are being built, and they are disappearing rapidly. They traded to Singapore up to the opening years of the present century, and a short time later they also ceased trading to Hong Kong. Their trade has recently only been with Yangtze and northern ports, almost exclusively between Shanghai and Shantung ports. The hull of this vessel is whale-backed or turreted with a narrow level deck, and it shows the fullest development of this form, which is more typical of northern junks. It is flat-bottomed owing to the shallow nature of the waters in which it works and owing to the necessity of beaching for repairs. It has five masts, but the distinctive feature about these is their disposition: a bowmast forward against the port bulwark, a foremast and a mainmast (a unique feature is the topsail on the mainmast in light airs) in the centre line, and aft a mizzenmast to port of the centre line and a quartermast before it against the port bulwark. The bluff bow, broad flat stern, and overhanging counter, and the almost rectangular sails are unmistakably characteristic of the northern junks. The vessels are generally between 120 and 180 ft. long; they carry a crew of 20–30 men and varied cargoes, especially oil in baskets and large discs of compressed soya bean. Unlike the junks of South China, they do not carry whole families. The Taputo trader from the head of Tsingtao wan has a similar mast arrangement.

The Antung trader may be regarded as another basic northern junk. It corresponds in every respect to the northern type except for its hull, which is plain-built with a flush deck. There are two heavy masts, the foremast with a rake forward, and the mainmast with a slight rake aft, while a light mizzenmast is fitted on one or both quarters. The vessel is about 70 ft. long, carries a crew of 15–20, while cargoes consist mainly of oil in baskets, soya bean cakes, and

rice; occasionally cargoes of planks are carried on the decks and also poles lashed to the hull by hawsers. The hulls of most northern junks are plain dark brown in colour owing to the use of preservative, although one exception is found in the bright colours of the 'Chinchow' trader from Fengtien.

The Foochow pole junk is the most typical of the junks found along the coast of China south of the mouth of the Yangtze. It derives its name from the trade in which it is engaged, carrying Foochow pine poles up and down the coast, particularly from Foochow to Shanghai and the lower Yangtze ports. The long-distance vessels *Keying*, *Whangpo*, and *Ningpo* were all junks of this interesting type. The narrow bows and very high sterns with galleon-like poops are prominent features of southern junks. The deck is flush, and vertical cross pieces are fitted at regular intervals to support the heavy cargo of poles stacked horizontally fore and aft over the side of the ship; heavy bamboo hawsers secure the load. The bow of the Foochow pole junk is peculiar to the type as it has a square stem piece with two wing-like flares, which serve as a protection against heavy seas; this form, however, is common also to many types of junk from Fukien and Chekiang provinces. There are three masts, the third consisting of a light mizzen right on the end of the poop and slightly off the centre line. The vessels are unusually large for Chinese coasting craft, varying between 120 and 180 ft. in length and carrying 25–35 men as crew. The sterns of Foochow pole junks are vividly painted and decorated, and two wide strips of colour run the whole length of the hull. This decoration varies according to home port, and native seamen can distinguish the vessels by the colours they display. An eye is nearly always painted on the bows so that the ship can 'see.' It is believed, however, by fishermen in the Canton delta that the eyes frighten away big fishes and evil spirits. These eyes are absent in the case of the Pechili trader, but other types from Fukien province show it.

There are many other local types of junks, such as the Hangchow bay trader, the Ningpo junk and other Yangtze types, and the rice and salt junks of the Canton delta. An interesting development outside Chinese waters is the Tongking junk, a type of ketch evolved in the last hundred years by Chinese traders—Hokkiens or Cantonese—settled in Malaya. The vessel has many features of seventeenth-century Dutch ships, but it is entirely native. Inland waterways, too, are characterized by an infinite variety of junk types, each especially adapted to the needs of its locality.

The Chinese Mercantile Marine

In 1939 the Chinese mercantile marine ranked twentieth in the world's merchant fleets of steamers and motor vessels of over 100 tons gross. It consisted of 164 vessels of 253,094 tons gross, and 7 motor ships of 4,830 tons gross, and it comprised 0·4 per cent. of the world's total tonnage. A large proportion of the merchant vessels had been taken over and sunk as blockships during the Japanese invasion; so that in order to view the merchant fleet in its true perspective it is necessary to assess its world rank in 1937, before the outbreak of hostilities. At that time the Chinese merchant fleet ranked fourteenth in the world's fleets, although it was only about one-seventh the size of that of Japan, and it represented only 1·4 tons of shipping per 1,000 inhabitants compared with 78 in the case of Japan. The development of the Chinese fleet of vessels over 100 tons gross as between 1886 and 1939 is shown in the table on p. 585. This table illustrates the slow progress of the merchant fleet up to 1916 and also the declines it experienced during the wars and disturbances affecting the country, especially in 1895, 1901, and 1911. The unsettled political conditions in the country provided a serious setback because the government frequently commandeered ships for military purposes. The growth of the fleet was also hindered by the foreign-owned steam vessels which had been introduced by foreign maritime countries and which were operating in the seaborne trade of China. The country had insufficient shipbuilding capacity to provide and maintain the large amount of tonnage necessary to compete on equal terms. The tonnage grew much more rapidly after the war of 1914–18 and this growth was apparently unaffected by the Japanese operations in Manchuria in 1931.

Composition of the Fleet

The latest list of Chinese vessels published in English was issued by the Maritime Customs in 1931—*List of Chinese Steam and Motor Vessels of 100 tons gross and over*, 1930 (Shanghai, 1931). This list contains particulars of 675 vessels, while *Lloyd's Register of Shipping* only gives 210 vessels of over 100 tons gross.

The figures, which are not complete for every vessel, undoubtedly include some inland navigation vessels and allowances must therefore be made for these. Some indication of this is given by the ports of registry. Over 180 vessels were registered at Shanghai and 149 at Canton, and of these many are probably river vessels.

Chinese Steamers and Motorships of over 100 tons gross, 1886–1939

Year	No. of vessels	Tons gross	Year	No. of vessels	Tons gross
1886	23	32,219	1912	65	87,242
1887	27	37,319	1913	66	86,690
1888	29	39,123	1914	73	93,095
1889	33	43,181	1915	79	97,536
1890	34	44,558	1916	80	97,841
1891	33	42,543	1917–18	No records available	
1892	41	47,806	1919	98	130,972
1893	39	47,753	1920	102	142,834
1894	35	44,312	1921	122	163,037
1895	15	19,037	1922	134	188,388
1896	39	50,851	1923	157	222,970
1897	40	54,192	1924	164	247,035
1898	46	62,179	1925	173	267,300
1899	48	64,558	1926	193	296,757
1900	48	65,721	1927	211	325,462
1901	25	29,176	1928	212	315,729
1902	44	59,731	1929	211	314,638
1903	45	60,491	1930	210	314,817
1904	46	62,656	1931	229	331,849
1905	44	57,436	1932	244	369,396
1906	47	62,943	1933	257	399,588
1907	50	67,634	1934	252	397,712
1908	51	68,281	1935	267	454,258
1909	60	75,258	1936	268	491,580
1910	68	90,420	1937	288	599,986
1911	66	86,550	1938	247	472,578
			1939	171	257,924

Based on successive volumes of *Lloyd's Register of Shipping* (London annually).

Furthermore, 98 were registered at Harbin in Manchuria, 46 at Hankow, and 27 at Wuchow on the Si kiang. Reliable statistics on Chinese shipping are very difficult to obtain, and even the lower figure is an underestimate. However, the salient features of Chinese shipping have remained the same since 1930, and an analysis of these figures does present some indication of the true position.

Out of a total of 624 vessels, for which the gross tonnage is given, 384 were vessels of between 100 and 500 tons gross ; the next most important category consisted of vessels between 1,000 and 2,000 tons gross, which totalled 116 vessels. Over 90 per cent. of the vessels were under 2,000 tons gross. Ten vessels were between 3,000 and 4,000 tons gross, 6 between 4,000 and 5,000 tons gross, while the

largest ship was 6,218 tons gross. Many of the smaller vessels must be employed in river service.

Some 29 per cent. of the vessels were under 5 years old, while 30 per cent. were between 10 and 20 years old. Altogether about 70 per cent. of the vessels were less than 25 years old, and the remainder were more than that age, and some were as much as 50 years old.

About 90 per cent. of the 624 vessels for which place of building is given were built at Shanghai, and a small percentage were built at Canton. Of foreign-built vessels 61 vessels were built at Hong Kong, and 95 at various yards in Great Britain. About half as many as the latter were built in Japan. The vessels over 1,000 tons gross, 158 in number, were nearly all over 10 years old, and of these 63 were built in Great Britain, 28 at Shanghai, including many of the newer vessels, and 16 in Norway.

State-owned Vessels

The Ministry of Communications is the government department responsible for shipping in China. Until the organization of the Marine and Navigation Bureaux in July 1931, the Marine Department of the Maritime Customs was responsible for controlling all Chinese ships. Under the new Maritime Law, Shipping Law, and Law for the Registry of Ships, however, the Ministry issued certificates of nationality to both steamers and sailing vessels of a certain size. At the same time the Ministry of Communications took over all registration, surveying, and inspection of vessels.

In 1939 the state owned four vessels totalling 7,645 tons gross. Two of these ships, including a British-built 2,923 tons gross train ferry, were operated by the railway administration, and two by the Transportation Department of the Chinese Navy. Apart from these, the government owned the principal Chinese shipping company, the *China Merchants Steam Navigation Co. Ltd.*, which in 1934 had a fleet of 28 vessels aggregating 50,750 tons gross, and ran services to all coastal and river ports. The company managed steamers as early as 1873, when it was organized as a semi-government enterprise. It was taken over completely as a government enterprise by the Ministry of Communications in 1932 after the approval of the Executive Yuan. Many of the company's ships were sunk as blockships in 1937.

Shipping Companies and Services

In 1934 there were eighty-five shipping companies in China, a great many being single ship companies. The *San Peh Steam*

Navigation Co. Ltd., of Shanghai, had the second largest fleet of any shipping company in 1934, with 18 vessels totalling 35,870 tons gross. The ships varied in size between 241 and 2,018 tons gross. The smaller ships were operated in Yangtze services with occasional sailings to north and south China. A number of tramps were run between Shanghai, Vladivostok, Rangoon, the Malay peninsula and Japan to carry rice and other bulk cargoes. The company also controlled the *Hoong On S.N. Co. Ltd.*, founded in 1915 by the combined capital of British and Chinese merchants, and which had 14 vessels of about 500 tons each, some of these being motor vessels.

The *Ching Kee Steam Navigation Co.* of Chefoo had in 1934 a total of 25 vessels aggregating 33,250 tons gross. It made great profits during the war of 1914–18, and extended its territory considerably. The vessels vary in size between 494 and 3,111 tons gross, and are employed as tramps. Other companies were the *North China S.N. Co.*, Tientsin (6 vessels of 10,700 tons gross), which operated tramps; the *Ningpo Shaohsing S.N. Co.* (3 vessels of 8,170 tons gross) which operated a vessel on each of the routes Shanghai and Ningpo and Shanghai and Hankow, and also ran one tramp; and the *Ming Sing Industrial Company*, a leading company in the upper Yangtze. It was founded in 1925 to run a service between Hochow and Chungking, but in 1929 it bought a number of other upper Yangtze shipping companies and extended its own operations to Iyang, Ichang, and Shanghai. The company had 24 vessels of shallow draughts and totalling 6,500 tons gross. It has increased in prosperity since the war in China began as it operated on Szechwan rivers and the Yangtze, and its vessels were not commandeered; it has also been able to augment its fleet by purchases from the middle and lower Yangtze.

Personnel

The Chinese junk sailor is a master of his craft, and he has few equals in handling his ship in bad weather or typhoons. Likewise, the Chinese seaman on board a propelled ship has a sound practical knowledge if no book knowledge. Most of them are promoted from deckhands or firemen, and regulations were adopted in 1928 for seamen's certificates whereby a seaman then in active service could obtain a certificate if his record of service was satisfactory. In 1933 the system of periodical examination of seamen was adopted. The training of ship's officers was undertaken at the Woosung Mercantile

Marine College under the control of the Ministry of Communications. After the fall of Shanghai a new college had to be opened in Chungking. The training of officers is continuing, and the government has expressed the feeling that the development of the Chinese mercantile marine will not be hampered by a serious shortage of trained personnel.

It was stated in 1942 that about 20,000 Chinese seamen were serving with the merchant fleets of the Allies. About half of these men serve in British ships, especially tankers and ships trading to the Far East in normal times, and many of the others are in United States vessels and also Dutch vessels. Most of the sailors are Cantonese or Fukienese and regularly form excellent crews all over the world, and their remittances, like those of the Chinese emigrants in the Netherlands East Indies and Malaya, form an important part of the economy of South China.

Foreign Shipping

Foreign shipping assumed a dominant position in Chinese waters to the detriment of native shipping, protected by the treaty rights acquired during the nineteenth century from the difficulties which confronted Chinese shipowners. Prior to 1937, as a result of the 'unequal treaties,' Great Britain, the U.S.A., Belgium, Brazil, Denmark, France, Italy, Japan, Mexico, the Netherlands, Norway, Peru, Portugal, Spain, and Sweden still enjoyed the special privilege of engaging in the inland navigation and coasting trade of China. Germany, Austria, and Hungary lost the privilege in consequence of the war of 1914–18, and the U.S.S.R. relinquished the right voluntarily in 1924. Considerable national feeling had been aroused in China by these privileges, and in 1930 the Ministry of Communications formulated a detailed programme for the abolition of shipping privileges accorded to foreigners in the inland waters of the country, but nothing was achieved until January 1943, when Great Britain and the U.S.A. relinquished their special rights for coasting and inland navigation in Chinese waters (including the employment of foreign pilots in Chinese territorial waters), and the treaty rights to the system of treaty ports in China were also abolished.

British Shipping

Since British shipping companies overhauled those of the Americans in the seventies, they have retained the most important position

among foreign countries trading in and to Chinese waters. British companies have been especially prominent in the coastwise trade and in lines on the Yangtze. The most important British line is the *China Navigation Co.* (Butterfield and Swire), which was established in 1872 and has its head office at Shanghai. It operated services on the Yangtze from Shanghai to Hankow, Shasi, Ichang, and Chungking, and coastwise lines served ports on the following routes: Shanghai–Tientsin, Shanghai–Hong Kong–Canton–Haiphong, Canton–Dairen–Newchang. The *Indo-China Steam Navigation Co. Ltd.* is the next most important company, and it developed its lines after it took over the ships of the great trading firm of Jardine, Matheson and Co. in 1881. It operates services on the Yangtze and a Calcutta–Hong Kong–Osaka service. Another old-established company is the *Douglas Steamship Co.*, which operated a line of passenger and cargo steamers from Hong Kong to South China ports. The *Hong Kong, Canton and Macao S.S. Co.* also ran daily services between these three ports. The main British ocean services to China include those of Alfred Holt and Co. (*Blue Funnel Line*) which ran the first vessel to China via the Cape of Good Hope in 1866 (this vessel belonged to the *Ocean S.S. Co.*), the *Peninsular and Oriental Line*, the *Glen Line* (controlled by A. Holt and Co.—*Ocean S.S. Co.*), the *Canadian Pacific Railway Co.* (with trans-Pacific services from Hong Kong and Shanghai, and carrying raw silk), and the *British India S.N. Co.*

Japanese Shipping

From 1900 onward Japanese shipping in Chinese waters showed a steady and fairly continuous growth ranking second to that of Great Britain; this growth was most marked during the war of 1914–18, Japan's percentage share rising from 25 per cent. in 1913 to 31·5 per cent. in 1918. In 1932 there was a significant decline in Japanese shipping, which dropped to third place to Great Britain and China; this was due partly to the diversion of Japanese ships to Manchurian ports and partly to the effect of Japanese aggression in Manchuria and at Shanghai on trade between Japan and China. After the outbreak of the Sino-Japanese war in 1937 the tonnage of Japanese shipping again fell, but its position improved relative to Chinese and other foreign shipping which were severely handicapped by the conditions entailed by hostilities along the seaboard and by the Japanese blockade.

The two leading Japanese shipping companies operating in

Chinese waters are the *Dairen Kisen Kaisha* and the *Nissin Kisen Kaisha*. The main services of the *Dairen Kisen Kaisha*, which is closely linked with the South Manchuria Railway, are Dairen–Tsingtao–Shanghai and Antung–Dairen–Shanghai, but the company also runs services outside Chinese waters. The *Nissin Kisen Kaisha* operates a Dairen–Tientsin–Tsingtao–Shanghai service, and has in addition a number of vessels running on the Yangtze. Other important Japanese lines calling at Chinese ports include the *Mitsui Bussan Kaisha*, the *Nippon Yusen Kaisha*, the *Osaka Shosen Kaisha*, and the *Kinkai Yusen Kaisha*.

Other Foreign Shipping

In the early period of Chinese shipping the interests of the U.S.A. were considerable, but at the end of the nineteenth century the American companies' fleets were sold. Since 1900 the percentage share of the U.S.A. in Chinese shipping has been less than 5 per cent., and the *Standard-Vacuum Oil Company's* oil tankers now represent the only American shipping interests in Chinese waters. The main American services to Chinese ports are operated by the *American Mail Lines*, *American President Lines* (*Dollar Steamship Lines*), *American Pioneer Line*, and the *Barber Steamship Lines*.

Norway generally ranks about fourth or fifth in tonnage of shipping, but the great majority of the Norwegian vessels are tramps chartered to Chinese shipping companies to run between Chinese and Far Eastern ports. The two most important Dutch lines operating in Chinese waters are the *Java-China-Japan Lijn* and the *Holland Oost Azie Lijn*, the former from the Netherlands East Indies to Hong Kong, Amoy, and Shanghai, and catering especially for Chinese emigrants returning home from the East Indies, the latter from European ports to Hong Kong and Shanghai ; the *K.P.M.* also operates an Orient–Java–Africa service between Shanghai and Capetown. German shipping showed a steady increase after 1920, reaching over 4,000,000 tons in 1930, keeping pace with the development of trade between Germany and China. The *Hamburg–Amerika Linie*, *Norddeutscher Lloyd* and *Rickmers Linie* are the chief German lines running to Chinese ports. Other important ocean services to China are operated by the Danish *Ostasiatiske Kompagni A/S* (East Asiatic Co.) and *Maersk Line* (A. P. Moller), by the Italian *Lloyd Triestino*, by the French *Messageries Maritimes*, and by the Swedish *Svenska Ostasiatiska Komp. Akt.* (Swedish East Asiatic Co.)

SHIPPING TRAFFIC

In 1936, the last year unaffected by war conditions, the total entrances and clearances at Chinese ports amounted to 140,019,018 tons, of which 45·2 million tons was in foreign trade and 99·8 million tons in domestic trade. The Maritime Customs returns, however, do not include Chinese junks and vessels trading under the Inland Waters Steam Navigation Regulations. The figures for the leading shipping nations were as follows :

Flag	Foreign trade	Domestic trade	Total	Percentage share
	tons net	tons net	tons net	
British	16,158,051	41,187,464	57,345,515	39·54
Chinese	7,335,294	36,836,351	44,171,645	30·46
Japanese	9,418,855	15,494,721	24,913,576	17·18
Norwegian	1,965,758	2,581,769	4,547,527	3·14
American	3,120,875	650,604	3,771,479	2·60
German..	1,965,131	659,367	2,624,498	1·81
Dutch	1,415,150	1,135,521	2,550,671	1·76
French	1,237,265	360,263	1,597,528	1·10
Danish	797,146	405,270	1,202,416	0·83
Portuguese	928,684	165,214	1,093,898	0·75

Source : Maritime Customs, *The Trade of China*, 1936, p. 119 (Shanghai, 1937).

The three leading countries thus accounted for nearly three-quarters of the foreign shipping, but over 93 per cent. of the coastwise shipping.

The total tonnage entered and cleared in 1936 was some 10 million tons greater than in 1932, but about 15 million tons less than the figure recorded in 1931, the last year which included the returns for the Manchurian ports (Fig. 93). This latter decrease was largely due to a decline in Japanese shipping of about 18 million tons in the 1931–36 period, but was offset to some extent by a steady gain on the part of Chinese shipping during the same period, amounting altogether to just over 11 million tons. British and other foreign shipping showed small increases between 1931 and 1936.

After 1936 the shipping position in China deteriorated rapidly owing to the closure of the Yangtze and the Si kiang and the blockade of the coast by the Japanese in their effort to deny 'Free China' access to supplies from abroad. By 1939 the total of entrances and

clearances was little more than 50 million tons (Fig. 93). All shipping interests suffered, but the Chinese mercantile marine was particularly hard hit, for the bulk of the vessels flying the Chinese flag were either destroyed or expropriated by the Japanese. On the

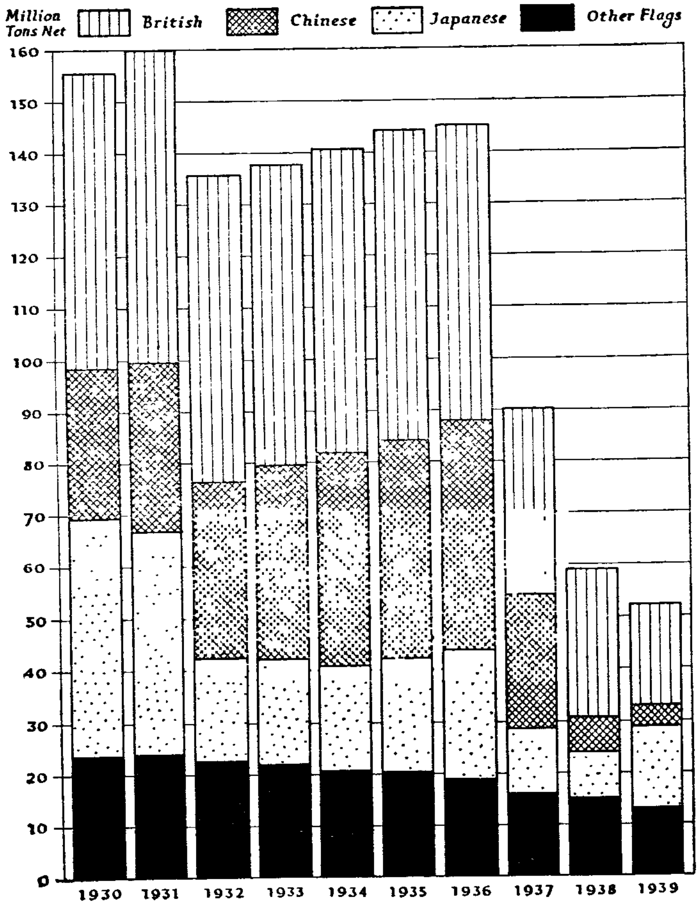

Fig. 93. Shipping at Chinese ports by flags, 1930–39

Based on successive annual volumes of Maritime Customs, *The Trade of China* (Shanghai).

other hand, the losses sustained by Japan were relatively the least severe, and in January 1940 the total of entrances and clearances of Japanese shipping at Chinese ports was about 900,000 tons, almost half of the total recorded. This figure greatly exceeded the total of British shipping (370,000 tons approximately), which was thus

relegated to second place. All the Japanese shipping interests in China were combined to form a single concern, the *East Asia Shipping Co.*, which enjoyed markedly preferential treatment and aimed at complete control of China's shipping traffic.

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Appendix III

POSTS, TELEGRAPHS, AND TELEPHONES

Postal Services: Telephones: Telegraph and Submarine Cables: Wireless Telegraphs and Telephones: Broadcasting: Note on Time.

Postal Services

From time immemorial Chinese imperial despatches were transmitted by the *I-chan* or Government Service of Couriers. Merchants and people having need for communication outside the bounds of their own immediate locality organized a similar service, known as *Minchü* and established posting *hongs* throughout the country.

Early in the 'sixties of the last century, when the foreign ministers took up residence in Peking, legation and customs mails were exchanged between Shanghai and Peking by utilizing the Government Service of Couriers. Very soon the Customs took over the responsibility of distributing these mails, both overland and by sea, which necessitated opening quasi-postal departments in the various Customs houses. As this system developed, the idea of a National Post Office was born. In 1878 China was invited to join the Postal Union, but the Chinese government at that time preferred to postpone the assumption of responsibility in this matter. By Imperial Decree of 1896 an Imperial Post Office for all China on Western lines was ordered, under the direction of Sir Robert Hart as Inspector-General of Customs and Posts. This great administrator had suggested this step as far back as in 1861.

In 1911 the conduct of the Post Office was transferred to the Ministry of Posts and Communications, and a special department, known as the Directorate-General of Posts, established. China's adhesion to the Universal Postal Convention dates from 1 March 1914, but it was not until the 1 September of that year that the regulations of the Rome Convention came into actual operation in China.

In the following short account of the activities of the Post Office, etc., no attempt has been made to describe modifications brought about owing to the Sino-Japanese hostilities, and in default of later information most of the figures and facts quoted refer to pre-war conditions.

The administration of the Post Office is centred in the Directorate-

General of Posts of the Ministry of Communications, and is controlled by a Director-General and a Deputy Director-General. The five departments into which the administration is divided, viz. General, Accounts, Development, International, and Supply Departments, are each in charge of a secretary. At the end of June 1936 the postal staff included 22 commissioners and 35 deputy commissioners.

China Proper, with Sinkiang, is divided into 21 postal districts. Shanghai, with a few surrounding offices, constitutes a separate district. The usurpation of political control in the three eastern provinces (Manchuria) forced entire evacuation by the Chinese Post Office.

The following statistics will give some idea of the growth and extent of the mail lines over which letters and parcels are carried and generally of the work undertaken by the Chinese Post Office:

Mail lines	1911	End of June 1936
	miles	miles
Major courier lines ..	106,300	148,300
Minor courier lines ..	..	91,600
Steamer and boat lines	15,000	38,600
Railway lines	5,700	6,900
Motor-bus lines ..	..	27,000
Air-mail lines	..	9,200
Total ..	127,000	321,600

General Statistics	1901	1911	End of June 1936	
Head and sub-head offices	30	49	Head offices	22
Branch and inland offices	134	908	First, second and third class offices and sub-offices	2,486
Agencies	12	5,244	Agencies	10,864
			Minor establishments	39,264
Articles dealt with	10,500,000	421,000,000		783,002,800
Parcels, number	126,800	4,237,000		7,015,700
Parcels, weight (kilos) ..		13,703,000		62,425,300
Registered articles		32,094,000		29,369,300
Express letters		2,692,000		11,206,100
Money orders issued ..		Hk. tls. 3,936,900		$179,440,700
Money orders cashed ..		Hk. tls. 3,984,200		$178,606,700

Under present war conditions it would serve no good purpose to outline the routes by which, in the past, the Chinese Post Office despatched mails to foreign countries, or to enlarge upon the many services it offers to the public. Nor, in the light of the severe depreciation which has taken place in the Chinese currency, would any advantage accrue from quoting here the pre-war postal tariff. Suffice it to say that, prior to the outbreak of the Sino-Japanese hostilities, the service offered, including that of a highly organized and efficient Postal Remittances and Savings Bank under its own directorate-general, was quite as complete, and the tariff as reasonable, as will be found in many well-developed Western countries.

Telephones

The first government telephone system was established at Canton in 1903. Since then progress has been rapid, and to-day most of the main cities of China have exchanges (some of which are automatic) and also toll telephone communications with neighbouring towns. Many cities have private telephone systems. Generally speaking, the number of lines in any one exchange is small, and, apart from Shanghai, range from 17,720 in Peiping to 100 or less in many smaller cities. Shanghai is served within the International Settlement and the French Concession by the Shanghai Telephone Company, which on 31 December 1938 had 63,355 telephones in service, while the number of local calls during that year was 126 millions. Outside of the Settlement and French Concession, the government exchange at Shanghai operated 5,850 lines on 31 December 1936.

Telegraphs and Submarine Cables

The Chinese telegraph system dates from 24 December 1881, when the line from Shanghai to Tientsin was opened. Two short lines between Shanghai and Woosung, and between Tientsin and Taku, were already in operation at that date, as well as submarine cables between Shanghai and Hong Kong. In 1882 Chinkiang and Nanking were linked to Shanghai, and by 1884 the line had been carried up the Yangtze as far as Hankow. In the same year Shanghai was linked up with Canton, and Tientsin with Peking, and the Shanghai–Tientsin line was extended to Shanhaikwan and Paoting,

with branches from Tsinan to Chefoo and Tsingtao. In 1883 Canton had been linked to Kowloon, the connexion being extended to Hong Kong in the following year. In 1887 the Shanghai–Hankow line was continued in the western and south-western provinces, further lines being opened up connecting the main cities of Sinkiang; and in 1897 a line across Mongolia from Kiakhta to Peking gave China land-telegraphic communication with Europe.

Telegraph conventions have been made with the three cable companies operating in China, viz: the Great Northern Telegraph Co. Ltd. (Danish), the Eastern Extension, Australasia and China Telegraph Co. Ltd. (British) (in connexion with Cable and Wireless Ltd.), and the Commercial Pacific Cable Co. (American); with Russia and Japan regarding the Manchurian telegraph system; with Japan regarding the cables between Dairen and Chefoo, between Shanghai and Nagasaki, and between Tsingtao and Sasebo; with India and France regarding the connexions at the Burmese and Indo-Chinese frontiers.

Until 1908 the Chinese land lines were operated by a Chinese company under government control. In that year they were taken over from the company and the provincial governments concerned by the Ministry of Communications. According to the *China Year Book* (Shanghai, 1939), duplex system Creed apparatus has been installed in the main circuits, with Wheatstone apparatus in most of the others.

The following figures give some idea of the extent of the telegraph system in operation at the end of June 1936:

	miles
Land lines	65,032
Wires	114,584
Underground cables	79
River cables	70

The rates as at 1 January 1939 for domestic telegrams ranged from $2\frac{1}{2}$ cents to 20 cents Chinese national currency per word, and for domestic press telegrams from 2 cents to 5 cents per word, in both cases according to whether the telegrams were couched in foreign or Chinese languages and were for transmission within the same town, the same province, or to other provinces. At the same date rates for foreign telegrams were as shown in the following table:

	Ordinary per word	Press per word
All countries in Europe (except Russia)	\$5·55	\$1·00
Russia in Europe	\$2·40	\$0·80
Russia in Asia	\$2·40	\$0·80
San Francisco	\$4·30	\$1·03
New York	\$5·15	\$1·27
Japan from Shanghai	\$0·30	\$0·10

Deferred telegrams to most countries were transmissible at half the ordinary rates, while night letter telegrams were available to the Philippine islands and daily letter telegrams to many other countries, both N.L.T. and D.L.T. telegrams being charged for at one-third of the ordinary rates, with a minimum charge for 25 words per telegram. For the reasons given in connexion with the postal tariff, it would be unprofitable to give further details of telegraphic charges, and it should be remembered that these given above are merely by way of illustration, for it is unlikely that they have remained unaltered under the prevailing conditions.

Wireless Telegraphs and Telephones

Prior to 1929, the development of radio communication in China was hindered by the lack of unity within the country. By 1914, when the Ministry of Communications became the controlling authority for radio, stations established or projected included Peking, Kalgan, Taku, Wuchang, Chefoo, Woosung, Nanking, Foochow, and Canton, 'all using the spark system, and mostly of 5 kw. power rating.' During the war of 1914–18 a French station was erected at Koukaza in the French Concession in Shanghai, which, while conducting a paid traffic, provided gratuitously the only radio transmission of weather and time signals to mariners in the China seas. In conformity with the principle of China's sovereign rights, the paid service was later discontinued, but the station continues to disseminate meteorological information in co-operation with more recently organized Chinese services of a similar nature. In 1925, long-wave stations of 10 kw. rating were established at Mukden and Taiyuan, and at Pratas island for meteorological service in 1926. Although unable reliably to communicate with Europe, the Mukden terminal was equipped for intercepting one-

way commercial traffic from the powerful Nauen and St. Assise long-wave stations in Europe, and the German and French agreements with the Mukden authorities were the first radio telegraphic agreements signed by China with foreign interests.

The experience gained of the special properties of short-wave telegraphy by the Nationalist armies in their northward advance in 1926–27 led to the organization of a domestic short-wave network linking all the main provincial cities under Nationalist control, and to the planning of a system of world-wide short-wave telegraphic and telephonic communications using the beam principle. By the end of 1928 some fifty stations, varying in power from 15 to 500 watts, had been set up in provincial cities, furnishing, for the first time in many cases, telegraphic contact with the coast, and in others replacing or supplementing line telegraphs which had suffered the depredations of climate or banditry.

All efforts to establish long-range radio communications resulted in failure, until the newly constituted National Government instituted a vigorous policy. In 1929–30 the framework of China's domestic and international radio communications was completely remodelled. Strong national sentiment and the newly discovered properties of short waves then combined to render it possible for the new regime to introduce political and technical changes of a far-reaching character, and within a few years phenomenal progress was achieved in both international radio telegraphy and telephony, as the following record of routes and opening dates will reveal :

Principal Sino-Foreign Radio-Telegraph Routes

Routes	Opened
Shanghai–Manila	14 Jan. 1929
Shanghai–Hong Kong	1 July 1929
Shanghai–Java	7 May 1930
Shanghai–San Fancisco (R.C.A.)	6 Dec. 1930
Shanghai–Berlin	6 Dec. 1930
Shanghai–Paris	1 Mar. 1931
Shanghai–Saigon	1 July 1931
Shanghai–Geneva	5 Feb. 1932
Shanghai–Moscow	10 Mar. 1933
Shanghai–San Francisco (Mackay)	19 May 1933
Shanghai–London	3 Feb. 1934
Shanghai–Tokyo	1 June 1934
Shanghai–Rome	21 Jan. 1935

Principal Chinese Radiophone Channels

Routes	Opened
Shanghai–Tokyo	15 Feb. 1936
Shanghai–North America ..	19 May 1937
Shanghai–Hankow	1 Sept. 1936
Shanghai–Canton and Hong Kong	1 Feb. 1937

It was hoped that these great achievements since the initiative was taken in 1929 would prove a source of satisfaction and profit to the Chinese National Government, but from 1 August 1938, following the outbreak of the Sino-Japanese hostilities, the functions of all radio stations formerly operated by the Ministry of Communications of the National Government in North and Central China have been taken over by the Japanese-sponsored North China Telephone and Telegraph Company and the Central China Telecommunications Company respectively.

BROADCASTING

Broadcasting in China did not commence until 1922, when a small station was set up in Shanghai. Two years later an American firm began to operate a 100-watt transmitter in the western district of the International Settlement, which broadcast mainly in English, and was supported by an association of subscribing members. In succeeding years numerous low-powered stations came into existence, many of which were badly organized and operated. The majority were located in the Shanghai area, where there were over 50 in 1935.

The first government-owned stations were set up in Peking and Tientsin in 1927, and others came into existence later in the same year at Foochow, Changsha, and Sian. In 1928 the National Government established the Central Broadcasting Station at Nanking, but broadcasting was not put on an organized basis until 1932. In that year a series of regulations were promulgated for the control of private stations, which were allowed to be set up and to be operated only under licence from the Ministry of Communications. By 1935 there were 95 public and private broadcasting stations in China,

on which the largest was the 75-kilowatt Central Broadcasting Station at Nanking.

After the outbreak of war in 1937 many of the broadcasting stations passed to the control of the Japanese, but others have been set up in different parts of ' Free China ' by the Central Broadcasting Administration, which in 1942 had 17 stations under its control. Of these by far the most important is the Central Broadcasting Station, now at Chungking, which broadcasts both on medium- and short-wave to all China. The basic language for these transmissions is *Kuo Yü* (see vol. i, p. 455), but programmes are also carried in the various dialects of Chinese and in Mongolian and Tibetan languages. Also at Chungking is the short-wave Chinese International Broadcasting Station (XGOX and XGOY), which broadcasts to Europe and America, utilizing English as its principal language.

It was estimated that before the Sino-Japanese war there were approximately 1,000,000 radio receiving-sets in China, the majority in the Shanghai and Nanking areas. The average of one set for every 400 persons approximately compares very unfavourably, for example, with such small countries as Belgium, with one set for every seven persons, or Denmark, with one set for every five persons.

Note on Time

There are two time-zones in China : the Eastern, which keeps Shanghai time, 8 hr. in advance of G.M.T. ; and the Western, which keeps Kansu-Szechwan time, 7 hr. in advance of G.M.T. Summer time is not used, and there have been no changes in the standard times since the outbreak of war in 1937 ; in effect, however, ' Free China ' kept Kansu-Szechwan time and the Japanese-occupied areas Shanghai time.

Appendix IV

CIVIL AVIATION

The possibilities of commercial aviation in a country of vast distances, high mountains, broad rivers, and poor communications were not fully appreciated until the establishment of the National Government in 1928. Since then interest has increased, and in 1937 there were three civil air lines running regular services between the more important centres in China. They were the China National Aviation Corporation (C.N.A.C.), the Eurasia Aviation Corporation (E.A.C.), and the South-western Aviation Corporation (S.A.C.).

Air lines operated by all three companies prior to the outbreak of war covered over 8,699 miles, and there were nearly 40 airfields, of which that at Lunghwa, near Shanghai, was reputed to be the best in the Far East. As regards traffic there had been during the fiscal year 1936–37 a total of 27,538 passengers and 268,198 lb. of mail matter carried, with a total mileage flown of nearly 2,485,500.

China National Aviation Corporation

The C.N.A.C. was formed by the Chinese government and American (Pan-American Airways) interests in 1930, and has been primarily concerned with developing air communications within China Proper. Prior to the outbreak of the war the company operated four main lines—Shanghai–Chêngtu, Shanghai–Canton, Shanghai–Peiping, and Chungking–Kunming. The Shanghai–Chêngtu service was particularly important, since it connected all the large economic centres along the Yangtze, and opened up a rich and populous part of the country otherwise inaccessible by speedy means of communication and transport. The performance record of this company is tabulated on p. 603.

Eurasia Aviation Corporation

This started as a Sino-German firm when it was formally inaugurated in 1931, but the German (*Deutsche Lufthansa*) interests were withdrawn in July 1941. It was organized firstly to develop domestic air lines with Shanghai as the starting point, and then to

Traffic Statistics of C.N.A.C., 1929–36

Year	Miles flown	Passengers carried	Weight in lb. of mail carried	Weight in lb. of freight carried
1929	58,007	220	8,669	
1930	330,117	1,979	39,444	
1931	445,217	1,989	75,901	
1932	431,325	2,741	112,107	
1933	667,921	2,644	110,635	
1934	891,562	4,545	139,407	
1935	1,184,609	9,147	163,241	59,003
1936	1,543,229	15,748	190,624	103,485

Source: Chinese Ministry of Information, *China Handbook*, 1937–1943, p. 257 (New York, 1943).

extend them to the Russian border in order to establish a connexion for direct services to Berlin. In June 1937 the company operated the following air lines: Shanghai–Lanchow, Peiping–Hankow, Peiping–Lanchow, Sian–Kunming, and Hankow–Hong Kong. At Hong Kong connexion was made with the Far Eastern services of British Imperial Airways and the trans-Pacific services of Pan-American Airways. While the main object of promoting Asia to Europe air lines had not been attained, the company had made steady progress in inaugurating domestic services.

Traffic Statistics of E.A.C., 1929–36

Year	Miles flown	No. of passengers carried	Weight of freight carried in lb.	Weight of mail carried in lb.
1931 (June to Dec.)	74,560	664	. .	571
1932	157,579	589	21,528	3,858
1933	256,379	810	56,006	7,959
1934	374,958	1,476	117,665	14,244
1935	462,762	2,951	189,280	22,888
1936	566,267	5,618	489,284	64,386

Source: Chinese Ministry of Information, *China Handbook*, 1937–1943, p. 262 (New York, 1943).

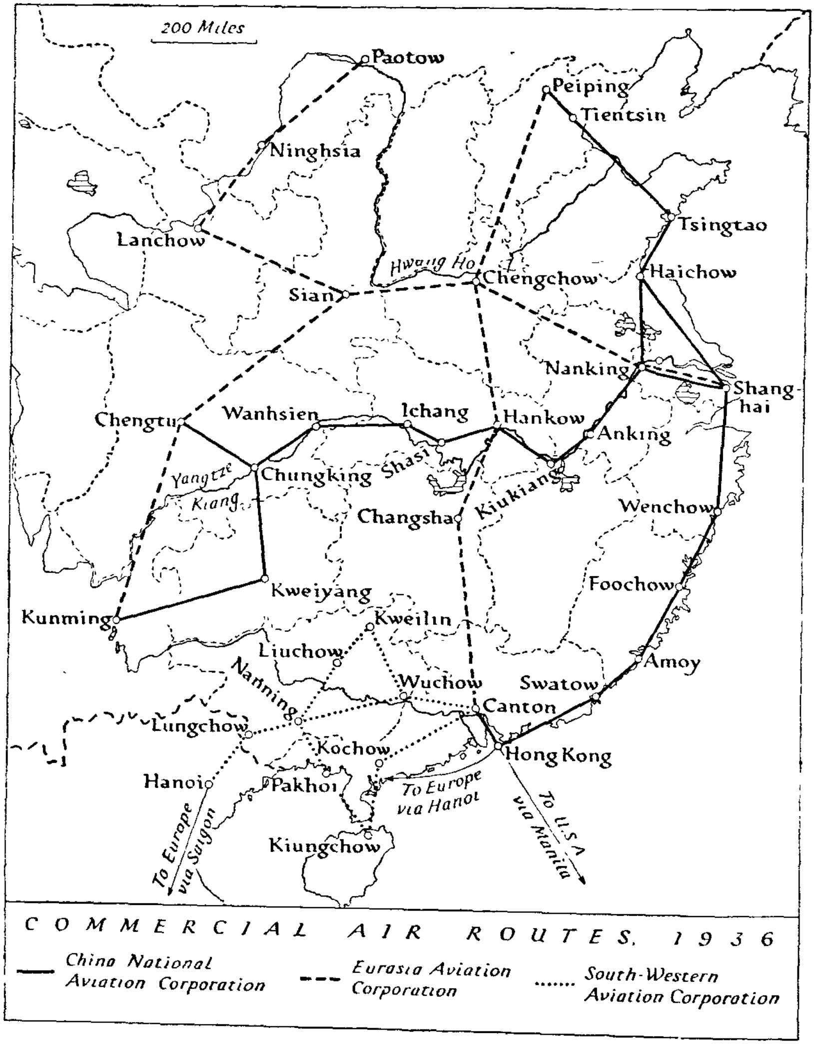

Fig. 94. Commercial air routes, 1936

Based on (i) Jardine, Matheson and Co., *China Shipping Manual*, 1937–1938, map at end (Shanghai, 1937); (ii) Maritime Customs, *The Trade of China*, 1936, facing p. 91 (Shanghai, 1937); and Chinese Ministry of Information, *China Handbook*, 1937–1943, pp. 258–59 (New York, 1943).

South-western Aviation Corporation

This purely Chinese undertaking was formed in 1933 to develop commercial aviation in the south-western provinces (the company was dissolved early in 1938). In 1936 the following services were in operation: Canton–Lungchow via Wuchow, Canton–Pakhoi via Kiungchow, and Canton–Nanning via Kweilin. By arrangement with *Air France*, the line to Lungchow was extended to Hanoi, thereby linking up with the Paris–Annam line, this being the first China–Europe service to be inaugurated.

War-time Developments

Since the Japanese invasion the former services centred on Shanghai and Peiping have been abandoned, and new air lines have been established in 'Free China.' During the first five years of war up to September 1942 the distance of new services opened totalled 5,800 miles. Regular air lines have been established with Chungking as the central terminus and major centres in the south-west and north-west are all accessible by air. At the same time connexions have been maintained with foreign airways. Before the fall of Hankow there were services to Hong Kong and French Indo-China, and aircraft of the China National Aviation Corporation began to fly to Burma and India in 1939 and 1941 respectively. In December 1939 a new Sino-Soviet Aviation Company was formed as a result of co-operation between the governments of China and the U.S.S.R., joining Chungking and Alma-Ata by an air line which passes through Hami, Tihwa, and Suitung.

Within occupied China, the Sino-Japanese Huitung Company, established in 1936 to operate lines from Peiping and Tientsin to Manchuria, was superseded by the Chinese Aviation Company, one of the various Sino–Japanese development companies established by the Japanese. In 1940 this concern was reported to be operating routes from Tientsin to Peiping, Kalgan, and Taiyuan; from Tientsin to Nanking, and from Nanking to Hankow.

Appendix V

CHINESE WEIGHTS AND MEASURES

Some progress towards uniformity in weights and measures in use in China has been achieved since the Revolution as a result of the promulgation of two sets of laws, viz. the Weights and Measures Law of 1914 and the Revised Law of Weights and Measures of 1929. Nevertheless, old practices persist in many parts of the country and also in documents, and no treatise on the subject of weights and measures in China could be considered adequate which did not give some account of the situation which existed prior to the promulgation of the two laws. The subject is a complicated one, and it is hoped that the following description of the old practices will help to illustrate the progress which has already been made and the difficulties which have to be overcome before complete uniformity can be achieved throughout China.

In theory, China throughout the centuries has used decimal notation with a few exceptions; in practice, the system of weights and measures has been chaotic, the standards varying not only in the different provinces, but also in the same town and in the same shop in regard to different articles. The following paragraphs attempt to record the position which existed prior to the passing of the Laws of 1914 and 1929, and which still persists in parts of the country to this day.

Measures of Weight

10 Li	=	1 Fên (Candareen)
10 Fên	=	1 Ch'ien (Mace)
10 Ch'ien	=	1 Liang (Tael)
16 Liang	=	1 Chin (Kin) or Catty
100 Chin	=	1 Tan or Picul

For purposes of foreign trade these weights are fixed as follows:

1 Liang = 583·3 grains = $1\frac{1}{3}$ oz. av. = 37·783 grammes
1 Catty = $1\frac{1}{3}$ lb. or 604·53 grammes
1 Picul = $133\frac{1}{3}$ lb. or 60·453 kilogrammes

In native trade the catty ranged from 12 to 42·5 ounces and the number of catties to the picul varied from 90 to 280.

Linear Measures

10 Fên	=	1 Ts'un (inch)
10 Ts'un	=	1 Ch'ih (foot)
10 Ch'ih	=	1 Chang
180 Chang	=	1 Li

There have been, it is estimated, several hundred kinds of Ch'ih in use in China, the length varying from 8·6 to 27·8 inches. Some of the standard lengths in various trades were:

	Inches
Carpenter's Ch'ih	= 11·14
Mason's Ch'ih	= 11·08 (10·09)
Artisan's Ch'ih	= 12·569
Board of Revenue's Ch'ih	= 13·181
Tailor's Ch'ih	= 13·85–14·05
Customs house Ch'ih	= 14·098
Junk builder's Ch'ih	= 15·769–15·69

To add to the complications, the standards varied in different places. Take, for example, the carpenter's and tailor's measures in five large cities:

	Carpenter's Ch'ih	Tailor's Ch'ih
Shanghai	11·14 inches	13·85–14·05 inches
Tientsin	12·35 ,,	13·14 ,,
Peking	12·68 ,,	13·45–13·58 ,,
Hankow	13·80 ,,	13·80 ,,
Canton	12·70 ,,	12·70 ,,

For purposes of the foreign customs trade the length of the Ch'ih was fixed as follows:

1 Ch'ih = 14·1 inches or 0·358 metres

A Li, theoretically 2,115 ft. or about two-fifths of a mile, is usually taken as a third of a mile.

Surface Measurement

10 Ssu	=	1 Hao
10 Hao	=	1 Li
10 Li	=	1 Fên
10 Fên	=	1 Mow
100 Mow	=	1 Ch'ing
25 square Ch'ih	=	1 Pu or Kung
240 Pu	=	1 Mow
100 Mow	=	1 Ch'ing

The Mow is regarded at Shanghai by custom as equivalent to one-sixth of an English acre (7,260 square ft.), but it varies through-

out China from 3,840 square ft. to 9,964 square ft. with one standard of 18,148 square ft.

Measures of Capacity

10 Shao	=	1 Ho
10 Ho	=	1 Shêng
10 Shêng	=	1 Tou
10 Tou	=	1 Shih

Measures of capacity are seldom used except for rice and grain. These are ordinarily sold wholesale by weight, as are also fluids such as oil, spirits, molasses, etc. The Tou for tribute purposes = 629 cubic inches (10·31 litres), but in different parts of the empire ranged from 176 to 1,800 cubic inches.[1]

THE WEIGHTS AND MEASURES LAW, 1914

The Weights and Measures Law was promulgated at the end of 1914, and established a double system, one being the standard metric unit, the other based on the 'ying tsao ch'ih' (builder's foot) for length, and the kuping tael (or liang) for weight. The law contained provisions for the inspection of weights and measures, imposed fines for the use of untested and fraudulent measures, and sanctioned the establishment of a special plan for the manufacture of instruments of weight and measure in order to secure absolute uniformity. The units of length, area, capacity, and weight with their foreign equivalents are:

Length:	1 Ch'ih	= 0·32 metres	= 1·049867 feet
Area:	1 Mow	= (6,000 sq. ch'ih)	= 0·06144 hectare = 0·15182 acre
Capacity:	1 Shêng	= 1·0354688 litres	= 1·09416 liquid quarts or 0·27354 gallons
Weight:	1 Liang	= 37·301 grammes	= 1·31561 oz. av.

The Revised Law of Weights and Measures, 1929

This law, setting up a new standard which it is intended will eventually become the legal standard of weights and measures acceptable throughout China, was promulgated by the National Government on 6 February 1929. For convenience' sake, and taking into account customary usage, it also established a double system: one, the standard metric unit, the other to be of a temporary nature and to be abolished as soon as the people became accustomed to the

[1] Morse, H. B., *Trade and Administration of the Chinese Empire*, pp. 172–4 (London, 1908).

standard unit, designed only for market use. As stated in the *China Year Book* (Shanghai, 1934):

'The latter is derived from the former, however, taking:

1 Litre or Kung Shêng = 1 Shih Shêng,

which is nearest to the Chinese customary unit of capacity "Shêng" and:

1 Half Kilogramme = 1 Shih Chin,

which is the average weight of the different varieties of "Chin" in different localities, and

1 Third of a Metre or Kung Ch'ih = 1 Shih Ch'ih,

which is the average length of different varieties of Chinese "Foot" in different localities, thus constituting the so-called 1, 2, 3 system of Chinese weights and measures based on the international metric standard.'

The following is a comparative table showing both the old and the new standards, together with their approximate foreign equivalents:

Old and New Standards

Measures of Weight

Old Standard

10 Wei	= 1 Hu	
10 Hu	= 1 Ssu	
10 Ssu	= 1 Hao	
10 Hao	= 1 Li	
10 Li	= 1 Fên or Candareen	
10 Fên	= 1 Ch'ien or Mace	
10 Ch'ien	= 1 Liang or Tael	= 37·79937 grammes = $1\frac{1}{3}$ oz. av.
16 Liang	= 1 Chin or Catty	= 604·7899 grammes = $1\frac{1}{3}$ lb.
100 Chin	= 1 Tan or Picul	= 60·47899 Kilos = $133\frac{1}{3}$ lb.
200 Chin	= 1 Ying	

New Metric Standard

1 Kung Ssu	= 1 Milligramme	
10 Kung Ssu	= 1 Kung Hao	= 1 Centigramme
10 Kung Hao	= 1 Kung Li	= 1 Decigramme
10 Kung Li	= 1 Kung Fên	= 1 Gramme
10 Kung Fên	= 1 Kung Ch'ien	= 1 Decagramme
10 Kung Ch'ien	= 1 Kung Liang	= 1 Hectogramme
10 Kung Liang	= 1 Kung Chin	= 1 Kilogramme
10 Kung Chin	= 1 Kung Heng	= 1 Myriagramme
10 Kung Heng	= 1 Kung Shih	= 1 Quintal
10 Kung Shih	= 1 Kung Tun	= 1 Tonne

Market Standard

10 Shih Ssu	= 1 Shih Hao	
10 Shih Hao	= 1 Shih Li	
10 Shih Li	= 1 Shih Fên	
10 Shih Fên	= 1 Shih Ch'ien	
10 Shih Ch'ien	= 1 Shih Liang	= $31\frac{1}{4}$ Grammes
16 Shih Liang	= 1 Shih Chin	= $\frac{1}{2}$ Kung Chin = 500 Grammes = 13 Liang and 4 Ch'ien (Kuping weight)
100 Shih Chin	= 1 Shih Tan	

Measures of Capacity

Old Standard

6 Ssu	= 1 Kuei
10 Kuei	= 1 Ch'ao
10 Ch'ao	= 1 Ts'o
10 Ts'o	= 1 Shao
10 Shao	= 1 Ho
10 Ho	= 1 Sheng = 1·0354688 litres = 1·09416 liquid quarts = ·27354 gallons
10 Shêng	= 1 Tou
5 Tou	= 1 Hu
2 Hu	= 1 Shih
2 Shih	= 1 Yin

New Metric Standard

1 Kung Ts'o	= 1 Millilitre	
10 Kung Ts'o	= 1 Kung Shao	= 1 Centilitre
10 Kung Shao	= 1 Kung Ho	= 1 Decilitre
10 Kung Ho	= 1 Kung Sheng	= 1 Litre or 1,000 c.c.
10 Kung Sheng	= 1 Kung Tou	= 1 Decalitre
10 Kung Tou	= 1 Kung Shih	= 1 Hectolitre
10 Kung Shih	= 1 Kung Ping	= 1 Kilolitre

Market Standard

10 Shih Ts'o	= 1 Shih Shao
10 Shih Shao	= 1 Shih Ho
10 Shih Ho	= 1 Shih Shêng = 1 Kung Shêng = 0·966 Shêng (Old Standard)
10 Shih Shêng	= 1 Shih Tou
10 Shih Tou	= 1 Shih Shih

Linear Measures

Old Standard

10 Fên	= 1 Ts'un (inch) = 1·41 English inches = 35·814 millimetres
10 Ts'un	= 1 Ch'ih (foot) = 14·1 English inches = 0·35814 metres
5 Ch'ih	= 1 Pu or Kung
2 Pu	= 1 Chang = 11 ft. 9 in. (English) = 3·5814 metres
10 Chang	= 1 Ying
18 Ying	= 1 Li = $\frac{1}{3}$ English mile = 576 metres

New Metric Standard

1 Kung Li	= 1 Millimetre	
10 Kung Li	= 1 Kung Fên	= 1 Centimetre
10 Kung Fên	= 1 Kung Ts'un	= 1 Decimetre
10 Kung Ts'un	= 1 Kung Ch'ih	= 1 Metre
10 Kung Ch'ih	= 1 Kung Chang	= 1 Decametre
10 Kung Chang	= 1 Kung Ying	= 1 Hectometre
10 Kung Ying	= 1 Kung Li	= 1 Kilometre

Market Standard

10 Shih Hao	= 1 Shih Li
10 Shih Li	= 1 Shih Fên
10 Shih Fen	= 1 Shih Ts'un
10 Shih Ts'un	= 1 Shih Ch'ih = $\frac{1}{3}$ of Kung Ch'ih = 1·4 Ch'ih (Old Standard)
10 Shih Ch'ih	= 1 Shih Chang
10 Shih Chang	= 1 Shih Ying
15 Shih Ying	= 1 Shih Li

Surface Measurement

Old Standard

100 sq. Fên	= 1 sq. Ts'un
100 sq. Ts'un	= 1 sq. Ch'ih
25 sq. Ch'ih	= 1 sq. Pu = 1 sq. Kung
100 sq. Ch'ih	= 1 sq. Chang
10 Ssu	= 1 Hao
10 Hao	= 1 Li
10 Li	= 1 Fên = 6 sq. Chang
10 Fên	= 1 Mow = $\frac{1}{6}$ English Acre = 240 sq. Pu
100 Mow	= 1 Ch'ing
540 Mow	= 1 sq. Li

New Metric Standard

1 Kung Li	= 1 Centiare
10 Kung Li	= 1 Kung Fên
10 Kung Fên	= 1 Kung Mow = 1 Are = 1,000 sq. Kung Ch'ih
100 Kung Mow	= 1 Kung Ch'ing = 1 Hectare

Market Standard

10 Shih Hao	= 1 Shih Li
10 Shih Li	= 1 Shih Fên
10 Shih Fên	= 1 Shih Mow = 6,000 sq. Shih Ch'ih
100 Shih Mow	= 1 Shih Ch'ing

Approximate Metric Equivalents

Measures of Weight

Market System

1 Hao	=	0·0000032	of a kilogramme
1 Li	=	0·00003125	,, ,,
1 Fên	=	0·0003125	,, ,,
1 Ch'ien	=	0·003125	,, ,,
1 Liang (oz.)	=	0·03125	,, ,,
1 Catty	=	0·5 (i.e. ½)	,, ,,
1 Tan (Picul)	=	50	kilogrammes

Standard System

1 Milligramme	=	0·000002	of a market Catty
1 Centigramme	=	0·00002	,, ,,
1 Decigramme	=	0·0002	,, ,,
1 Gramme	=	0·002	,, ,,
1 Decagramme	=	0·02	,, ,,
1 Kilogramme	=	2	market Catties
1 Myriagramme	=	20	,, ,,
1 Quintal	=	200	,, ,,
1 Tonne	=	2000	,, ,,

Measures of Capacity

Market System

1 Shao	=	0·01	of a litre
1 Ho	=	0·1	,,
1 Shêng (pint)	=	1	litre
1 Tou	=	10	litres
1 Shih	=	100	

Standard System

1 Millilitre	=	0·001	of a market Shêng (pint)
1 Centilitre	=	0·01	,, ,,
1 Decilitre	=	0·1	,, ,,
1 Litre	=	1	market Shêng
1 Decalitre	=	10	,, ,,
1 Hectolitre	=	100	,, ,,
1 Kilolitre	=	1000	,, ,,

Linear Measures

Market or Municipal System

1 Hao	=	0·0000333	of a metre
1 Li	=	0·000333	,, ,,
1 Fên	=	0·00333	,, ,,
1 Ts'un	=	0·0333	,, ,,
1 Ch'ih (foot)	=	0·333	,, ,,
1 Chang	=	3·333	metres
1 Yin	=	33·333	,,
1 Li	=	500	,,

Standard System

1 Millimetre	=	0·001	of a market Ch'ih (foot)
1 Centimetre	=	0·03	„ „
1 Decimetre	=	0·3	„ „
1 Metre	=	3	market Ch'ih
1 Decametre	=	30	„ „
1 Hectometre	=	300	„ „
1 Kilometre	=	3000	„ „

Surface Measurement

Market System

1 Hao	=	0·00667	of an are
1 Li	=	0·0667	„
1 Fên	=	0·667	„
1 Mow	=	6·667	ares
1 Ch'ing	=	666·667	„

CONVERSION TABLES

Metric and British Units

It is customary to think of the 'metre' and the 'yard' as representing unalterable units of length. This is not so. The metre was originally intended to be the 10,000,000th part of the earth's meridional quadrant. But the accurate determination of this length proved to be extremely difficult—partly for technical reasons, and partly because of different conceptions of the 'figure of the earth.' In view of these difficulties it became necessary to define the length of the metre in terms of suitable metal bars measured under specified conditions of temperature, pressure, humidity, etc. Similar standard bars were also used to define the length of other units such as the yard. As all these metallic standards are subject to change, conversion tables differ according to the date of comparison between different bars. The tables that follow are based on the comparison between the yard and the metre made in 1895. This made 1 metre equivalent to 39·370113 in.

Metric System : List of Prefixes

Deca means ten times.	Deci means a tenth part of.
Hecto means a hundred times.	Centi means a hundredth part of.
Kilo means a thousand times.	Milli means a thousandth part of.

In abbreviations the Decametre, etc., is Dm., and the decimetre, etc., dm.

Note on 'Nautical,' 'Geographical,' and 'Statute' miles

A British 'nautical mile' is the length of the minute of the meridian at any given latitude, and is therefore a variable unit. It is given in feet for Clarke's 1880 spheroid by the formula

$$60771{\cdot}1 - 30{\cdot}7 \cos 2 \text{ Lat.}$$

This is the sea mile of the scale of latitude and distance of the Admiralty Charts. From the above formula it will be found to vary from 6,046·4 ft. at the equator to 6,107·8 ft. at the poles, being 6,077·1 ft. at latitude 45°.

The so-called 'international nautical mile' of 1,852 m. or 6,076 ft. is the length of the minute of the meridian at latitude 45° on the international spheroid. This corresponds to the 6,077 ft. for Clarke's spheroid.

A 'geographical mile' is a fixed unit, being defined by some as the length of a minute of the equator and by others as that of the minute of the meridian at latitude 45°. According to the former definition its value on Clarke's spheroid is 6,087 ft. and according to the latter 6,077 ft. The round figure 6,080 is usually adopted for the purposes of ordinary navigation.

The British 'statute mile' measures 5,280 ft.

List of Conversion Tables

Table 1. *Length*

Nautical mile	Statute mile	Kilometre	Metre	Yard	Foot	Inch	Centimetre
1	1·152	1·853	1853	2027	6080*	72,960	185,300
0·8684	*1*	1·60934	1609·34	1760	5280	63,360	160,934
0·5396	0·621372	*1*	1000	1093·61	3280·84	39,370·1	100,000
0·0005396	0·0006214	0·001	*1*	1·09361	3·28084	39,3701	100
0·0004934	0·0005682	0·0009144	0·914399	*1*	3	36	91·4399
0·0001645	0·0001894	0·0003048	0·3048	0·33333	*1*	12	30·48
0·0000137	0·0000158	0·0000254	0·0254	0·02778	0·083333	*1*	2·54
0·0000054	0·0000062	0·00001	0·01	0·0109361	0·032808	0·393701	*1*

* This is the customary British practice, and not the 'international nautical mile,' which Great Britain has not adopted.

Table 2. *Area*

Square mile	Square kilometre	Hectare	Acre	Square metre	Square yard
1	2·58998	258·998	640	2,589,980	3,097,600
0·386103	*1*	100	247·106	1,000,000	1,195,990
0·003861	0·01	*1*	2·47106	10,000	11,959·9
0·0015625	0·0040469	0·404685	*1*	4046·85	4840
0·00000039	0·000001	0·0001	0·000247	*1*	1·19599
0·00000032	0·00000084	0·0000836	0·000207	0·836126	*1*

Table 3. *Yield per Unit Area*

Tons per acre	Metric tons per hectare	Quintals per hectare
1	2·51071	25·1071
0·398294	*1*	10
0·0398294	0·1	*1*

Table 4. *Volume and Capacity*

Kilolitre	Cubic metre	Cubic yard	Bushel	Cubic feet	Imp. gall.	Litre	Pint
1	1·000027	1·30799	27·4969	35·3157	219·976	1000	1759·80
0·999973	*1*	1·30795	27·4962	35·3148	219·970	999·973	1759·75
0·764532	0·764553	*1*	21·0223	27	168·178	764·532	1345·43
0·0363677	0·0363687	0·0475685	*1*	1·28435	8	36·3677	64
0·028316	0·028317	0·037037	0·778602	*1*	6·22882	28·3160	49·8306
0·0045460	0·0045608	0·0059461	0·125	0·160544	*1*	4·54596	8
0·001	0·001000	0·001308	0·027497	0·035316	0·219976	*1*	1·75980
0·0005682	0·0005683	0·0007433	0·015625	0·020068	0·125	0·56824	*1*

Table 5. *Weight*

Ton	Metric ton or millier	Quintal	Kilogram	Pound
1	1·01605	10·1605	1016·05	2240
0·984207	*1*	10	1000	2204·62
0·0984207	0·1	*1*	100	220·462
0·0009842	0·001	0·01	*1*	2·20462
0·0004464	0·0004536	0·004536	0·45392	*1*

Table 6. *Temperature : Equivalents of Fahrenheit and Centigrade Scales*

°F.	°C.	°F.	°C.	°F.	°C.	°F.	°C.	°F.	°C.	°F.	°C.
100	37·7	79·25	26·25	58	14·4	37·4	3	17	− 8·3	− 4	− 20
99·5	37·5	79	26·1	57·2	14	37	2·7	16·25	− 8·75	− 5	− 20·5
99	37·2	78·8	26	57	13·8	36·5	2·5	16	− 8·8	− 5·8	− 21
98·6	37	78	25·5	56·75	13·75	36	2·2	15·8	− 9	− 6	− 21·1
98	36·6	77	25	56	13·3	35·6	2	15	− 9·4	− 6·25	− 21·25
97·25	36·25	76	24·4	55·4	13	35	1·6	14	− 10	− 7	− 21·6
97	36·1	75·2	24	55	12·7	34·25	1·25	13	− 10·5	− 7·6	− 22
96·8	36	75	23·8	54·5	12·5	34	1·1	12·2	− 11	− 8	− 22·2
96	35·5	74·75	23·75	54	12·2	33·8	1	12	− 11·1	− 8·5	− 22·5
95	35	74	23·3	53·6	12	33	0·5	11·75	− 11·25	− 9	− 22·7
94	34·4	73·4	23	53	11·6	32	0	11	− 11·6	− 9·4	− 23
93·2	34	73	22·7	52·25	11·25	31	− 0·5	10·4	− 12	− 10	− 23·3
93	33·8	72·5	22·5	52	11·1	30·2	− 1	10	− 12·2	− 10·75	− 23·75
92·75	33·75	72	22·2	51·8	11	30	− 1·1	9·5	− 12·5	− 11	− 23·8
92	33·3	71·6	22	51	10·5	29·75	− 1·25	9	− 12·7	− 11·2	− 24
91·4	33	71	21·6	50	10	29	− 1·6	8·6	− 13	− 12	− 24·4
91	32·7	70·25	21·25	49	9·4	28·4	− 2	8	− 13·3	− 13	− 25
90·5	32·5	70	21·1	48·2	9	28	− 2·2	7·25	− 13·75	− 14	− 25·5
90	32·2	69·8	21	48	8·8	27·5	− 2·5	7	− 13·8	− 14·8	− 26
89·6	32	69	20·5	47·75	8·75	27	− 2·7	6·8	− 14	− 15	− 26·1
89	31·6	68	20	47	8·3	26·6	− 3	6	− 14·4	− 15·25	− 26·25
88·25	31·25	67	19·4	46·4	8	26	− 3·3	5	− 15	− 16	− 26·6
88	31·1	66·2	19	46	7·7	25·25	− 3·75	4	− 15·5	− 16·6	− 27
87·8	31	66	18·8	45·5	7·5	25	− 3·8	3·2	− 16	− 17	− 27·2
87	30·5	65·75	18·75	45	7·2	24·8	− 4	3	− 16·1	− 17·5	− 27·5
86	30	65	18·3	44·6	7	24	− 4·4	2·75	− 16·25	− 18	− 27·7
85	29·4	64·4	18	44	6·6	23	− 5	2	− 16·6	− 18·4	− 28
84·2	29	64	17·7	43·25	6·25	22	− 5·5	1·4	− 17	− 19	− 28·3
84	28·8	63·5	17·5	43	6·1	21·2	− 6	1	− 17·2	− 19·75	− 28·75
83·75	28·75	63	17·2	42·8	6	21	− 6·1	0·5	− 17·5	− 20	− 28·8
83	28·3	62·6	17	42	5·5	20·75	− 6·25	0	− 17·7	− 20·2	− 29
82·4	28	62	16·6	41	5	20	− 6·6	− 0·4	− 18	− 21	− 29·4
82	27·7	61·25	16·25	40	4·4	19·4	− 7	− 1	− 18·3	− 22	− 30
81·5	27·5	61	16·1	39·2	4	19	− 7·2	− 1·75	− 18·75	− 23	− 30·5
81	27·2	60·8	16	39	3·8	18·5	− 7·5	− 2	− 18·8	− 23·8	− 31
80·6	27	60	15·5	38·75	3·75	18	− 7·7	− 2·2	− 19	− 24	− 31·1
80	26·6	59	15	38	3·3	17·6	− 8	− 3	− 19·4	− 24·25	− 31·25

Table 7. *Pressure : Equivalents of Millibars, Millimetres of Mercury, and Inches of Mercury at 32° F. in Latitude 45°*

Mercury in.	Milli-bars	Mercury mm.	Mercury in.	Milli-bars	Mercury mm.	Mercury in.	Milli-bars	Mercury mm.	Mercury in.	Milli-bars	Mercury mm.	Mercury in.	Milli-bars	Mercury mm.
27·02	915	686·3	27·82	942	706·6	28·62	969	726·8	29·41	996	747·1	30·21	1,023	767·3
27·05	916	687·1	27·85	943	707·3	28·65	970	727·6	29·44	997	747·8	30·24	1,024	768·1
27·08	917	687·8	27·88	944	708·1	28·67	971	728·3	29·47	998	748·6	30·27	1,025	768·8
27·11	918	688·6	27·91	945	708·8	28·70	972	729·1	29·50	999	749·3	30·30	1,026	769·6
27·14	919	689·3	27·94	946	709·6	28·73	973	729·8	29·53	1,000	750·1	30·33	1,027	770·3
27·17	920	690·1	27·97	947	710·3	28·76	974	730·6	29·56	1,001	750·8	30·36	1,028	771·1
27·20	921	690·8	28·00	948	711·1	28·79	975	731·3	29·59	1,002	751·6	30·39	1,029	771·8
27·23	922	691·6	28·03	949	711·8	28·82	976	732·1	29·62	1,003	752·3	30·4	1,030	772·6
27·26	923	692·3	28·05	950	712·6	28·85	977	732·8	29·65	1,004	753·1	30·45	1,031	773·3
27·29	924	693·1	28·08	951	713·3	28·88	978	733·6	29·68	1,005	753·8	30·48	1,032	774·1
27·32	925	693·8	28·11	952	714·1	28·91	979	734·3	29·71	1,006	754·6	30·51	1,033	774·8
27·35	926	694·6	28·14	953	714·8	28·94	980	735·1	29·74	1,007	755·3	30·53	1,034	775·6
27·38	927	695·3	28·17	954	715·6	28·97	981	735·8	29·77	1,008	756·1	30·56	1,035	776·3
27·41	928	696·1	28·20	955	716·3	29·00	982	736·6	29·80	1,009	756·8	30·59	1,036	777·1
27·44	929	696·8	28·23	956	717·1	29·03	983	737·3	29·83	1,010	757·6	30·62	1,037	777·8
27·46	930	697·6	28·26	957	717·8	29·06	984	738·1	29·86	1,011	758·3	30·65	1,038	778·6
27·49	931	698·3	28·29	958	718·6	29·09	985	738·8	29·89	1,012	759·1	30·68	1,039	779·3
27·52	932	699·1	28·32	959	719·3	29·12	986	739·6	29·92	1,013	759·8	30·71	1,040	780·1
27·55	933	699·8	28·35	960	720·1	29·15	987	740·3	29·94	1,014	760·6	30·74	1,041	780·8
27·58	934	700·6	28·38	961	720·8	29·18	988	741·1	29·97	1,015	761·3	30·77	1,042	781·6
27·61	935	701·3	28·41	962	721·6	29·21	989	741·8	30·00	1,016	762·1	30·80	1,043	782·3
27·64	936	702·1	28·44	963	722·3	29·24	990	742·6	30·03	1,017	762·8	30·83	1,044	783·1
27·67	937	702·8	28·47	964	723·1	29·26	991	743·3	30·06	1,018	763·6	30·86	1,045	783·8
27·70	938	703·6	28·50	965	723·8	29·29	992	744·1	30·09	1,019	764·3	30·89	1,046	784·6
27·73	939	704·3	28·53	966	724·6	29·32	993	744·8	30·12	1,020	765·1	30·92	1,047	785·3
27·76	940	705·1	28·56	967	725·3	29·35	994	745·6	30·15	1,021	765·8	30·95	1,048	768·1
27·79	941	705·8	28·59	968	726·1	29·38	995	746·3	30·18	1,022	766·6	30·98	1,049	786·8

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